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THE BASIC ELEMENTS OF AGRICULTURAL COMPETITIVENESS

In Three Parts:

- Economics and Policy
- Geography
- History

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THE BASIC ELEMENTS OF AGRICULTURAL COMPETITIVENESS

In Three Parts:

- **Economics and Policy**
- **Geography**
- **History**

Authors. This briefing is based on materials supplied by John Dunmore, T. Kelley White, Gary Vocke, and Michael Trueblood, ERS Agriculture and Trade Analysis Division, and was designed and written on contract to ERS by William J. Hudson, The ProExporter Network®, Maumee, Ohio. The principal source of data used in this briefing is "World Agriculture: Trends and Indicators, 1970-89," Francis Urban, USDA-ERS Statistical Bulletin Number 815.

The Basic Elements of Agricultural Competitiveness

INTRODUCTION

Since the slowdown of U.S. agricultural exports in the mid-1980's, questions about our agricultural competitiveness have been asked frequently.

- Can U.S. farmers compete?
- Is U.S. agriculture competitive?
- How can we increase our competitiveness?

We all prefer simple answers, but these questions turn out to be much more difficult than they may look. At an individual level, all Americans are familiar with the concept of "competitiveness," and we rarely stop to give it a formal definition. At the national level, however, when we speak of the country's "overall agricultural competitiveness," a large number of factors come into play simultaneously.

The goal of this booklet is to explain the basic principles of agricultural competitiveness from three different perspectives — economics and policy, geography, and history. The three points of view are not mutually exclusive but strongly overlapping. We will begin with a review of the basic economic principles that underlie successful competition, show how international conditions and policies can modify these underlying principles, illustrate with maps and other diagrams the present structure of international agriculture, and then trace the trends that have brought us to the current juncture.

Part One, Economics and Policy. Every competitor makes an investment in various resources, such as land, labor, capital, and management. We call these the competitor's "owned resources." When we speak of a "successful competitor," we mean one with a low cost of production and a good return to the investment in his or her owned resources. A competitor who is not successful often seeks to reduce costs, as by becoming more *productive* (i.e., by increasing output without increasing input). A competitor who is not successful may also seek alternative uses for his or her owned resources, either in alternative commodities or in uses completely outside agriculture. The greater the returns from such alternatives, the *less competitive* such producers will be in producing a particular commodity, or even remaining in agriculture.

A key point about competitiveness is that the "low cash cost producer" does not necessarily drive out all other competition, so long as price is high enough for the "high cash cost producers" to earn a return on their assets which they consider satisfactory.

Available resources, costs and returns all have to do with what economists refer to as "relative efficiencies," or *fundamental competitive advantages*. As we move beyond the individual level of competition, however, to the national and international, two other main elements of competitiveness come into play — macroeconomic conditions (such as exchange rates) and policy. The effect of exchange rates and policy can often be so powerful as to override the underlying or fundamental advantages of a country (its "relative efficiencies"). In this booklet, the effect of exchange rates is explored for South American soybeans, and a dramatic case of the impact of policy is shown with Saudi Arabian wheat production and exports. Many U.S. domestic farm policies also have an effect on commodity production, trade, and competitiveness.

As the famous political economist and philosopher Adam Smith said in the 18th century, "It is the maxim of every prudent master of a family never to attempt to make at home what it will cost him more to make than to buy." And furthermore, "What is prudence in the conduct of every private family can scarce be folly in that of a great kingdom. If a foreign country can supply us with a commodity cheaper than we ourselves can make it, better buy it of them with some part of the produce of our own industry, employed in a way in which we have

some advantages." Smith's idea of the gains from trade on the basis of "comparative advantage" has long lain at the root of the free trade argument. Today, however, the elements of exchange rates and policy can so distort trade and investment that former underlying advantages are permanently altered.

Part Two, Geography. World agricultural land is divided into cropland (1,474 million hectares) and pasture land (3,209 million hectares), some of which alternates between these two usage classes depending on relative prices, weather, and other conditions. Population and income affect how cropland is used, as do such technologies as irrigation, mechanization, and fertilization.

In this part of the booklet, the world is divided into a dozen or so main geographical regions, and schematic displays are given to show market shares of world trade in the main kinds of agricultural products. Six categories of products are displayed: (1) livestock, (2) feedstuffs, (3) foodgrains, (4) vegetable oils, (5) fruits, vegetables, sugar, beverages, and other foods, and (6) fibers and tobacco.

The central role of the European Community in the trade of all six products is clear in the displays, which further emphasize the role of rational agrticultural policies in developing competitiveness.

Part Three, History. The elements of competitiveness — comparative costs, exchange rates, and policies — affect such real outcomes as export volume, farm income, market price, and government outlays. A "feedback loop" develops between the outcomes of competitiveness and its main, formative elements; in other words, depending on how favorable the outcomes are judged to be, a country (or region, or individual) will *change* its costs, exchange rates, and policies.

These changes can be seen best over a long period of time, and in this final part of the booklet, world and U.S. agricultural trade data are presented back to the early 1900's.

The share of U.S. crop production exported has grown from a range of 5 to 20 percent in the period before 1940 to nearly 40 percent in the post World War II era. The up-and-down pattern of exported acreage is closely tied to economic conditions and to direct government payments to farmers. The share of crop production exported is also correlated with U.S. grain stocks, idled land, and crop price supports.

In the case of U.S. wheat exports, important roles have been played by such programs as "Food for Peace," Commodity Credit Corporation credit guarantees, and Export Enhancement. The change of the European Community from a large net *im*porter of wheat to a net *ex*porter has also had a dramatic impact on U.S. wheat export volume and share of world trade.

In the case of U.S. corn and feedstuff exports, U.S. share has remained at a much higher level than for wheat and foodgrains.

Despite continued increases in U.S. farm productivity, overall export share has been lost in recent years, due in part to larger foreign investments in research, to technology transfer, and to changes in agricultural policies.

This booklet is meant to work like an informal briefing, made with a series of overhead transparencies. Each page contains a "screen" of illustrative material, accompanied above and below by "instructor's comments" — followed by a question to the reader. The answer to each question will be found on the next page.

The Basic
Elements of
Agricultural
Competitiveness

PART ONE. ECONOMICS AND POLICY

Our discussion of competitiveness will require a series of careful distinctions between words that we normally take for granted. Let's start with the definition of an "agricultural producer" (farmer), which relies on three other key concepts in economics — resources, costs, and returns.

DEFINITION OF "AGRICULTURAL PRODUCER" (FARMER) IN TERMS OF ECONOMICS

- Owns a specific set of resources
  (such as land, labor, capital, and management)
- Incurs costs of production for various alternative commodities
  (such as for seed, fertilizer, and other inputs, and for interest on loans)
- Achieves returns (profits) on the owned resources
  (which range from "satisfactory" to "unsatisfactory," depending on the difference between market price and the cost of production)

If the returns are judged to be unsatisfactory, then the producer may seek alternative uses for his or her owned resources.

Question. Which is more important to achieving satisfactory returns on owned resources — low costs of production or high market prices?

It is the difference between cost and price that is most important, rather than the absolute level of either one. The farmer competes in one set of markets (internally) to buy inputs (ideally at favorably low prices) and to sell outputs (ideally at favorably high prices).

JUDGING AGRICULTURAL COMPETITIVENESS

Internally	Externally
How well farmers compete for resources within their own domestic economy with which to produce commodities.	How well farmers compete with producers in other countries for world markets.

The production from 1 of every 3 U.S. acres planted is exported, so the profitability of U.S. agriculture may depend on how well U.S. producers compete in international ("external") markets.

Question. Suppose we are told that a certain agricultural producer (say, "Producer A") is a successful competitor. What is meant by being a successful competitor, internally, within the domestic agricultural sector?

When we speak of a "successful competitor," in agriculture as in any business, we mean one who generally has a low cost of production and a good return to the investment in his or her resources. However, both of these measures, cost and return, are relative and not absolute. Examine the following data on three hypothetical competitors.

COSTS AND RETURNS OF THREE PRODUCERS

Item	Producer A	Producer B	Producer C
		$ per bushel	
Market price	2.50	2.50	2.50
Cash cost of production	2.00	2.20	2.40
Return to owned resources	0.50	0.30	0.10
		$ per acre	
Return to owned resources associated with 1 acre of production	50	30	10

In this example, the producers are all assumed to have equal yields of the same crop. But the data show that relative to the other two competitors, Producer A is the "lowest cash cost producer."

Question. In the above example, can Producers B and C still be "successful competitors" even though they are not the "lowest cash cost producers"?

Yes, Producers B and C can be successful competitors without being the lowest cash cost producers — so long as market price is high enough to provide them a return that they believe to be satisfactory. In other words, so long as price is high, Producers B and C are not driven out of the market by Producer A, despite the fact that B and C have higher costs.

COSTS AND RETURNS OF THREE PRODUCERS

Item	Producer A	Producer B	Producer C
		$ per bushel	
Market price	2.50	2.50	2.50
Cash cost of production	2.00	2.20	2.40
Return to owned resources	0.50	0.30	0.10
		$ per acre	
Return to owned resources	50	30	10

Producers B and C are competitive if production of this commodity (at the prevailing price) is the best alternative (provides the greatest return) for their owned resources.

Question. Suppose now that some of the producers above have an alternative use for their owned resources. How would such alternative uses affect competitiveness?

Producers remain in or leave competition depending on returns to alternative uses of their resources. For instance, in the example below, Producers A and B will switch their resources out of Commodity 1, since better alternatives for the use of their resources exist.

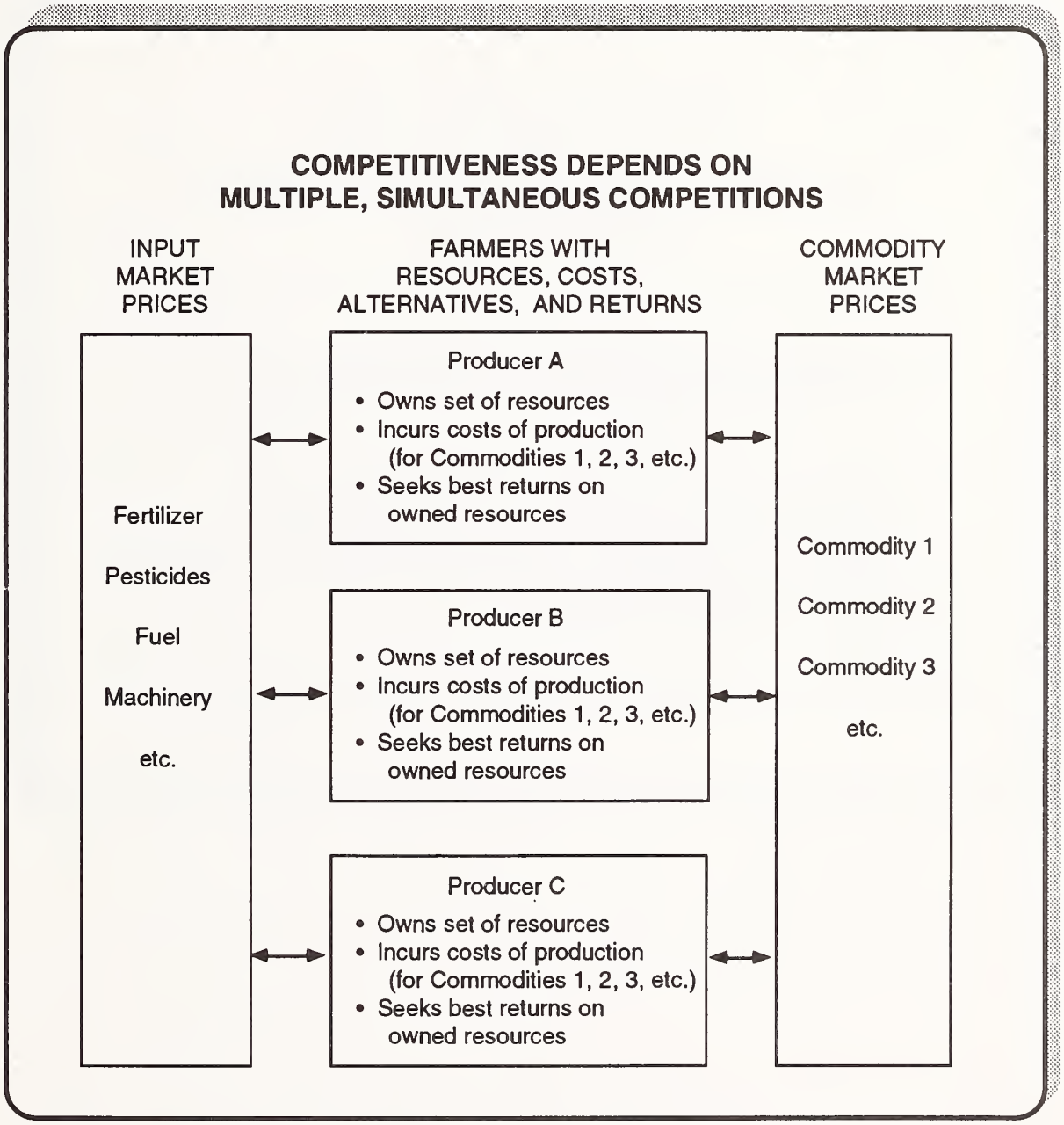
RETURNS TO OWNED RESOURCES OF THREE PRODUCERS

Alternative	Item	Producer A	Producer B	Producer C
			$ per bushel	
Commodity 1	Market price	2.50	2.50	2.50
	Cash cost of production	2.00	2.20	2.40
	Return	0.50	0.30	0.10
			$ per acre	
Commodity 1	Return	50	30	10
Commodity 2	Return	60	40	0
Noncommodity use	Return	70	0	0

In this case, Producer C becomes the most competitive in Commodity 1, even with the highest cash costs of production, because there are no better alternatives for C's owned resources. Producer A's best alternative is a noncommodity use, and B would shift resources to Commodity 2.

Question. Does competitiveness, then, depend mainly on cash costs of production and market prices?

Competitiveness depends simultaneously on many things, some of which are shown below. Farms must not only compete for prices in commodity markets, but must also compete at the same time for inputs with which to produce the commodities. Within a single farm, different commodities compete for the farmer's owned resources.



Question. Is competitiveness static? What factors can change over time and thus cause a change in relative competitiveness?

Competitiveness is not static with regard to time. Changes in a host of factors cause changes in the levels of relative competitiveness.

CHANGES IN A PRODUCER'S COMPETITIVENESS CAN BE CAUSED BY:

- Changes in the price of purchased inputs
- Changes in the technical efficiency of production of the commodities in question
- Changes in the technical efficiency of production of other commodities, which are alternatives for the producer
- Changes in the price of the commodity in question, or in the price of alternative commodities

Question. Should "competitiveness" be thought of differently as we move from the farm level to the national and international levels?

Competitiveness has so far been discussed at the farm level, even though public concerns about our agricultural competitiveness usually focus on the international dimension. The basic concepts at either level are the same, however, with certain differences gaining importance as we move into the international aspects.

FARM-TO-FARM COMPETITION
VS
COUNTRY-TO-COUNTRY COMPETITION

Similarities

- Competitiveness depends on relative, not absolute, differences in costs and returns
- Competition occurs simultaneously in output markets and input markets
- Competitiveness is affected by both prices and technology

Differences

- The concept of a farmer's specific "owned resources" is replaced by sector- or country-specific resources such as soil, water, and transportation/marketing infrastructure
- Relative values of currencies between countries affect international competitiveness
- Price levels are not the same in all markets; because governments intervene, prices faced by producers are not the same, for outputs or inputs

Question. In terms of whole countries, what leads to agricultural competitiveness? In other words, what are the main elements of agricultural competitiveness?

In the remainder of this booklet, we will approach the concept of agricultural competitiveness at the national and international levels. Three elements, (1) comparative costs and efficiency, (2) exchange rates, and (3) policy, were major determinants of agricultural competitiveness in the 1980's.

ELEMENTS OF AGRICULTURAL COMPETITIVENESS

- Comparative costs -- relative efficiency, or what economists refer to as comparative advantage
- Exchange rates -- a part of what economists call the macroeconomic environment
- Policies -- including agricultural and trade policies, both domestic and foreign

Question. Which of these three elements of competitiveness is most important?

Neither comparative costs nor exchange rates nor policies can be seen separately as the most important element of agricultural competitiveness. In today's world, all three elements can play important roles, and all three elements are simultaneously at work.

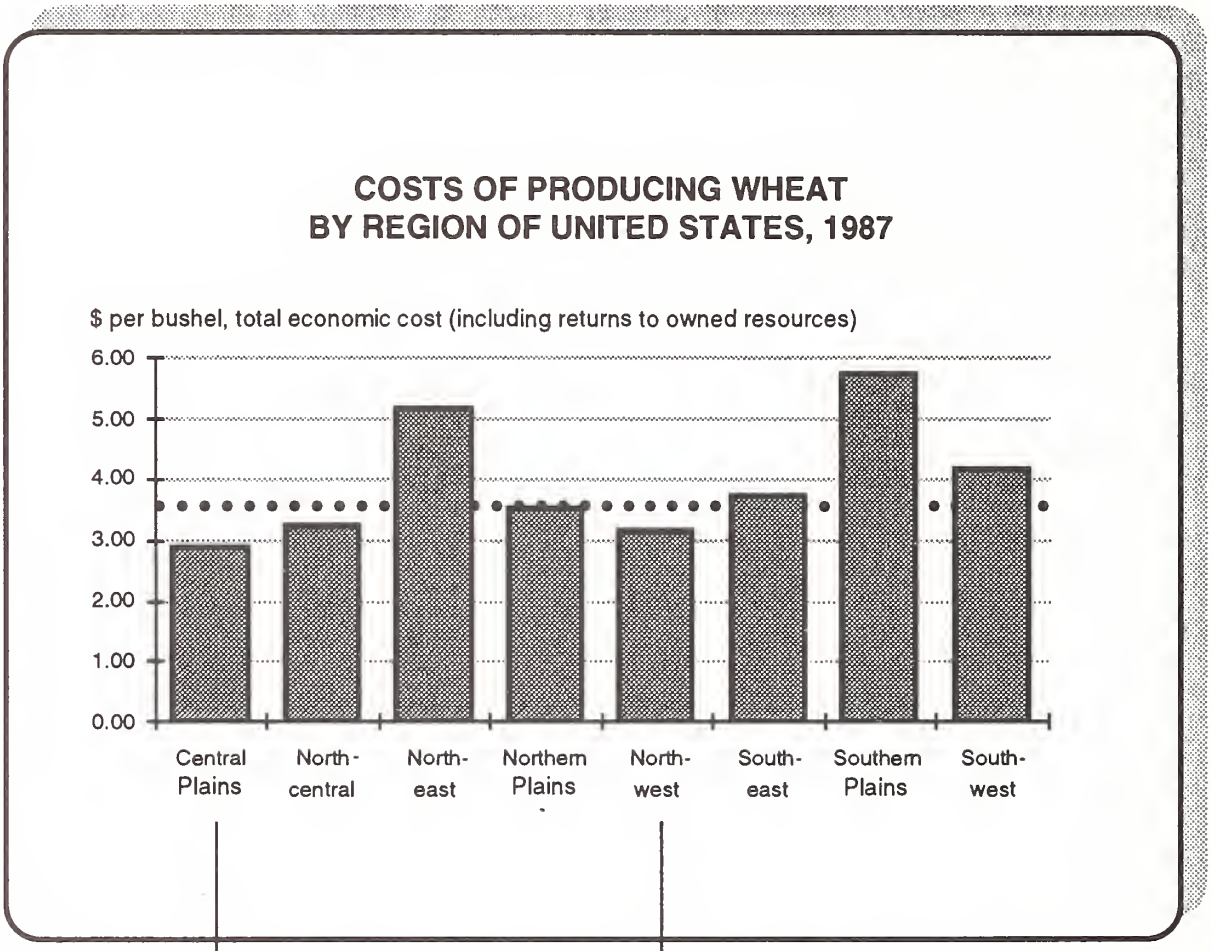
ELEMENTS OF AGRICULTURAL COMPETITIVENESS

- Comparative costs -- relative efficiency, or what economists refer to as comparative advantage
- Exchange rates -- a part of what economists call the macroeconomic environment
- Policies -- including agricultural and trade policies, both domestic and foreign

The element of comparative costs is usually considered the "underlying" or "fundamental" element of competitiveness. Let's examine how this works on a "level playing field" — that is, within a single country, where there is little or no difference in exchange rates or policies.

Question. Which region of the United States has the greatest cost advantage in the production of wheat?

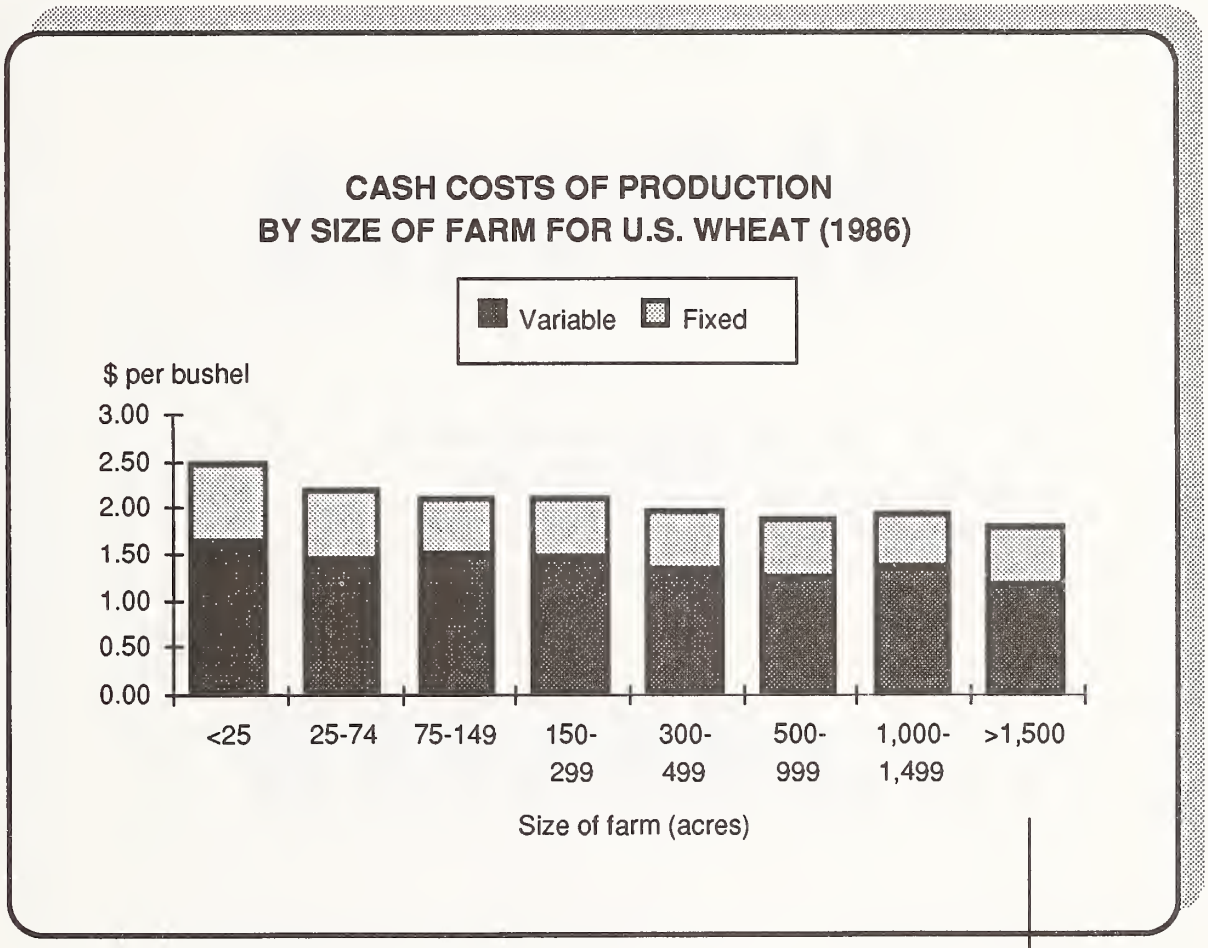
In the United States, the Central Plains has the greatest cost advantage in the production of wheat.



Regions with abundant natural resources, favorable climate, and few good crop alternatives are likely to have an advantage over other regions in production costs.

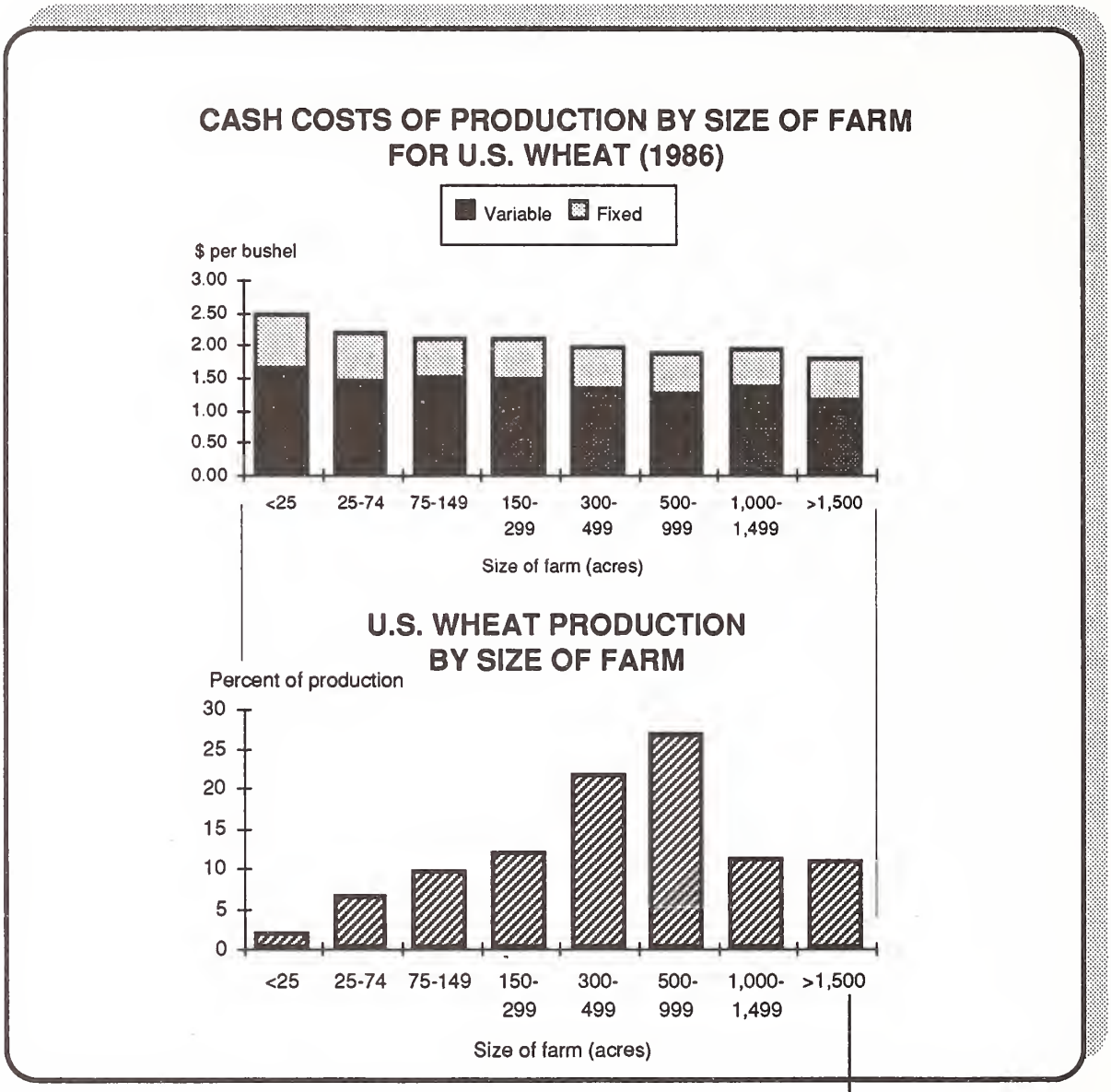
Question. What else besides natural resources can affect relative costs of production?

The scale of farm operation can have a significant role in relative efficiency, both within a geographic region and throughout a country.



The largest wheat farms are often the most efficient (the "lowest cash cost producers").

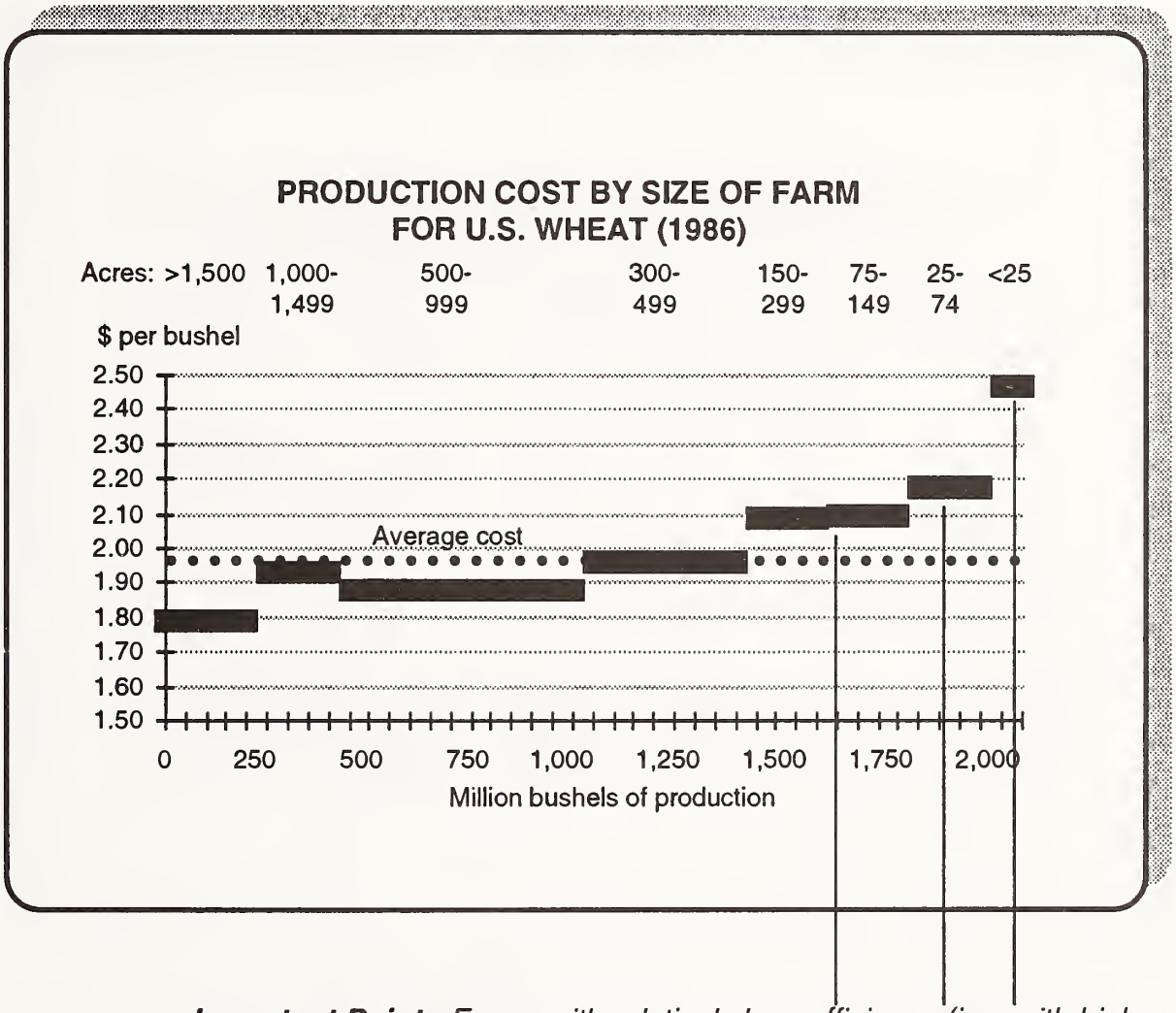
Question. What portion of total U.S. wheat is produced by the largest farms?



Only about 12 percent of U.S. wheat production is by the largest farms (the "lowest cash cost producers").

The chart on the next page displays the same information as above, but in a form that will be useful (later) for comparing different countries.

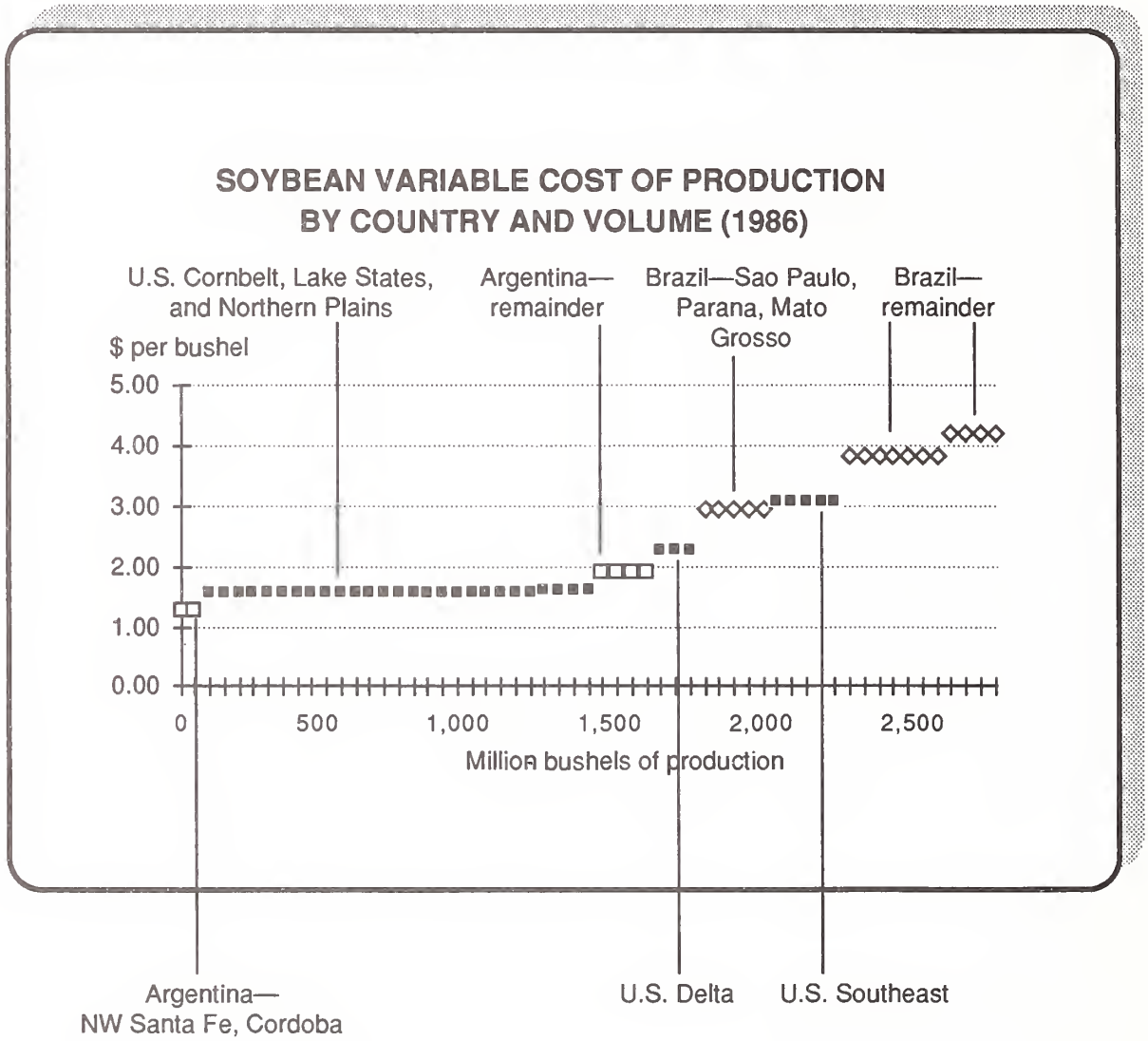
By itself, the "average cost of production" for the entire country is only a rough indication of competitiveness. Each region within the country has its own cost, which can be well below or well above the average. And, each farm within each region has its own costs, which can be above or below the region's average.



Important Point: *Farms with relatively less efficiency (i.e., with higher than average costs of operation) may still be competitive, if market price is high enough to provide a "satisfactory" return — compared to alternative uses for the farmer's owned resources.*

Question. How can the cost of agricultural products be compared between countries?

Country comparisons of costs of production must take into account several factors. Examine the graph of soybean production costs shown below, which says that some parts of the United States have lower costs than Argentina and Brazil, but that some parts do not.



Question. Before we conclude which of the above regions are most competitive, on the basis of the <u>variable costs of production</u> shown, what other factors should be considered?

The previous comparison of variable costs of production leaves out the fixed costs of production, and it also leaves out marketing costs, both domestic and international.

DOMESTIC MARKETING AND OCEAN COSTS BY COUNTRY
(Based on wheat to the former Soviet Union, 1984)

Item	France	Australia	Argentina	Canada	United States
			$ per bushel		
Domestic storage and handling	0.29	0.36	0.38	0.46	0.33
Domestic transportation	0.35	0.34	0.35	0.55	0.54
Other domestic costs	0.16	0.27	0.05	0.04	0.00
Total domestic costs	0.80	0.97	0.78	1.05	0.87
Ocean transportation	0.32	0.62	0.78	0.38	0.53
Total domestic and ocean	1.12	1.59	1.56	1.43	1.40

The United States has a cost advantage over South America in the handling and shipping of agricultural products — especially to key destinations, such as the former Soviet Union. Such costs of marketing can offset, or enhance, advantages which countries may have in variable costs of production.

Question. The comparison above, and the one on the previous page, is stated in terms of dollars per bushel. Are these comparisons affected by exchange rates?

Yes. The big problem in comparing relative costs and efficiencies between countries is getting the comparison on a common base — and this means using exchange rates. We must begin, as shown below, with costs stated in local currencies.

SOYBEAN VARIABLE COSTS IN UNITED STATES AND ARGENTINA (1986-87)

Location	Variable cost in country currency	Unit
U.S. Cornbelt	1.55	$ per bushel
Argentina, NW Santa Fe	1.55	Australs per bushel

No comparison between these two costs can be made without knowing the relative value of the austral to the dollar.

Question. (Try the arithmetic yourself!) Suppose that one U.S. dollar is worth 1.29 australs. What would be the cost of Argentine soybeans stated in U.S. currency?

The calculation would proceed as follows:

$$\text{Argentine soybean cost in U.S. dollars} = \frac{\text{1.55 australs per bushel}}{\text{1.29 australs per \$}} = \$1.20 \text{ per bushel}$$

SOYBEAN VARIABLE COSTS IN UNITED STATES AND ARGENTINA (1986-87)

Location	Variable cost in country currency	Unit	Exchange rate (units per dollar)	Variable cost in dollars per bushel
U.S. Cornbelt	1.55	$ per bushel	1.00	1.55
Argentina, NW Santa Fe	1.55	Australs per bushel	1.29	1.20

With the exchange rate at 1.29 australs to the dollar, Argentina's soybean costs look competitive. But what if the exchange rate <u>changes</u>?

Question. (Try the arithmetic again.) Suppose now that, for reasons unrelated to agriculture, the austral appreciates in value such that one U.S. dollar is now worth 0.97 australs. What is the cost of Argentine soybeans stated in U.S. currency?

The second calculation would proceed as follows:

$$\text{Argentine soybean cost in U.S. dollars} = \frac{\text{1.55 australs per bushel}}{\text{0.97 australs per \$}} = \$1.60 \text{ per bushel}$$

SOYBEAN VARIABLE COSTS IN UNITED STATES AND ARGENTINA (1986-87)

Location	Variable cost in country currency	Unit	Exchange rate (units per dollar)	Variable cost in dollars per bushel
U.S. Cornbelt	1.55	$ per bushel	1.00	1.55
Argentina, NW Santa Fe	1.55	Australs per bushel	*Period 1* 1.29	1.20
			Period 2 0.97	1.60

In terms of this example, Argentina did not necessarily become a less efficient producer in period 2; the Argentine domestic cost remained 1.55 australs per bushel. But a change in the exchange rate can make it appear that Argentina became more costly, when the figures are stated in dollars per bushel.

Question. Judging a country's competitiveness on the basis mainly of production costs (with or without exchange rates) can be misleading. Are there other measures of efficiency which will tell us something about competitiveness?

Yes, one such measure is "productivity." Productivity refers to the quantity of output achieved from a given amount of input, such as land or labor. One way for producers to lower their costs, and thus become more competitive, is to increase output per unit of combined inputs— or in other words, "to become more productive." The data below show how the productivity of U.S. farm labor has increased over the past 40 years, compared to nonfarm labor.

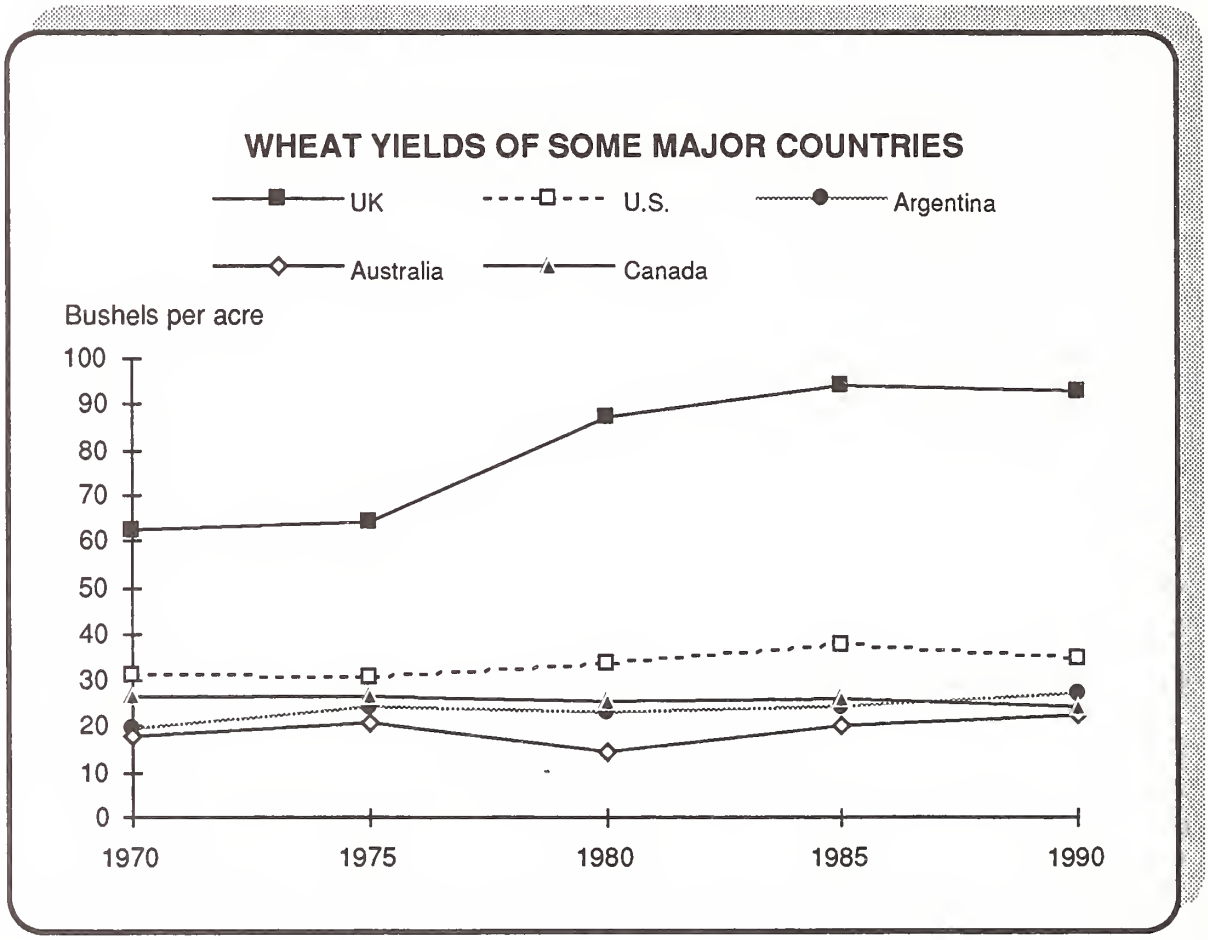
CHANGES IN U.S. LABOR PRODUCTIVITY, 1950-90

Year	Nonfarm	Farm
	Index, 1970 =100	
1950	64	30
1960	79	57
1970	100	100
1980	112	147
1990	124	200

Investment and technological change have allowed U.S. agriculture to become steadily more efficient in terms of labor productivity, especially compared to the nonfarm sector. Other indices show the same progress in terms of land and capital. U.S. agriculture is a high-technology, capital-intensive sector of the economy, able to bid successfully for resources against other sectors.

Question. How does the productivity growth of U.S. agriculture compare with that of other countries?

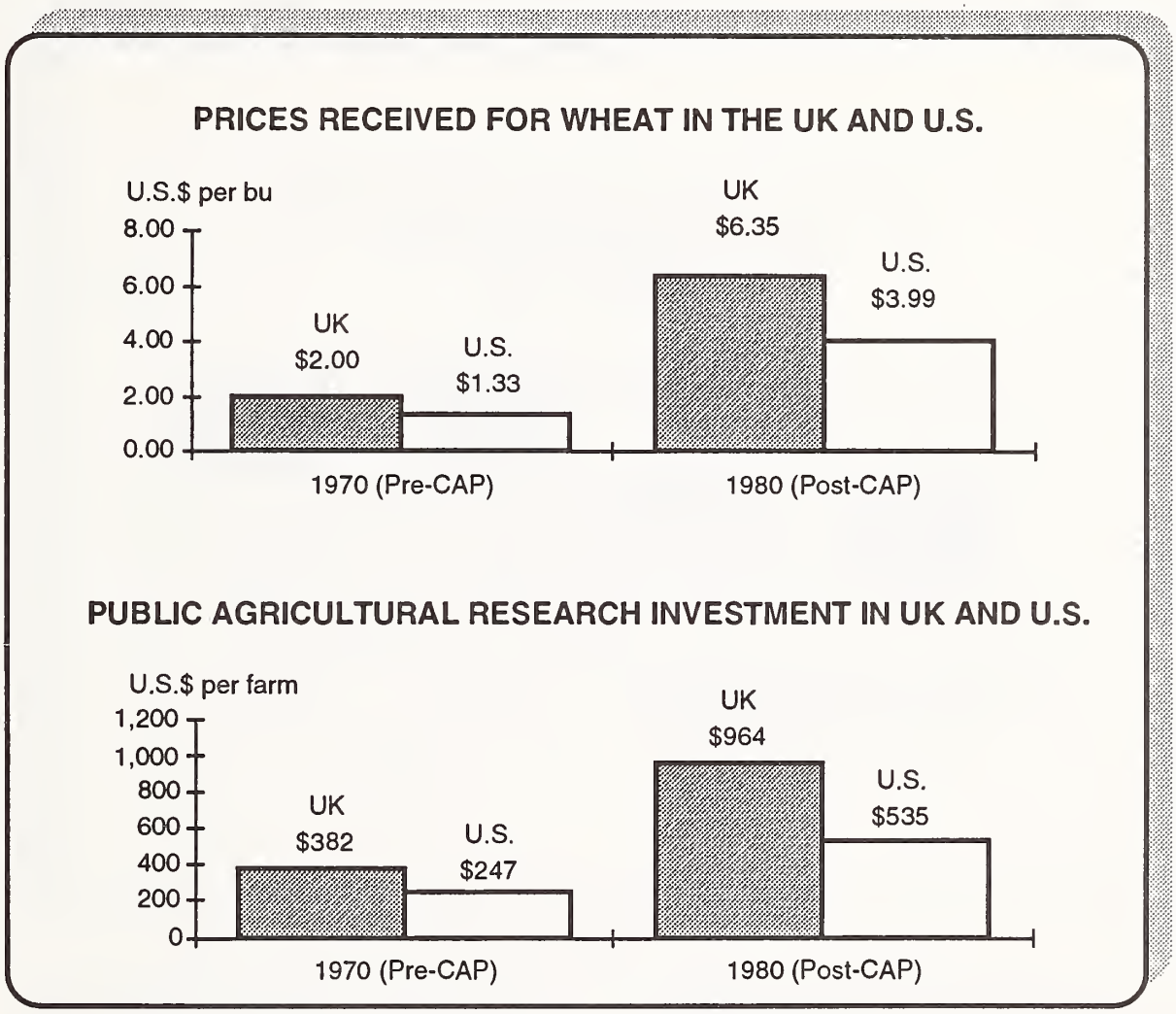
The U.S. agricultural sector has maintained a strong position in terms of relative efficiency and productivity compared to other countries. One way to see improvements in efficiency and productivity is through growth of crop yields.



In the case of wheat, for instance, the United States has been able to maintain a technological advantage over most other major competitors. Notice, however, the dramatic improvements by the United Kingdom.

Question. What explains the substantial gains in wheat yield by the United Kingdom, especially as shown above in the late 1970's and thereafter?

Much of the growth in the UK's agricultural productivity is attributable to the adoption of new technologies and new investment in its agricultural sector, brought on by the system of producer incentives known as the Common Agricultural Policy (CAP) of the European Community (EC).



The United Kingdom was a major importer of wheat prior to its accession to the European Community in 1973. By the early 1980's, the UK had become a net exporter of wheat. High internal prices under the CAP and increased public and private investment in agriculture spurred a significant boost in wheat yields.

Question. How does the comparison of production costs and productivity growth relate to the concept of "comparative advantage"?

"Comparative advantage" is a statement about underlying relative efficiencies. Adam Smith, in his book Wealth of Nations, may have explained the notion of advantage more succinctly than anyone since then:

"COMPARATIVE ADVANTAGE"
ADAM SMITH (1776)

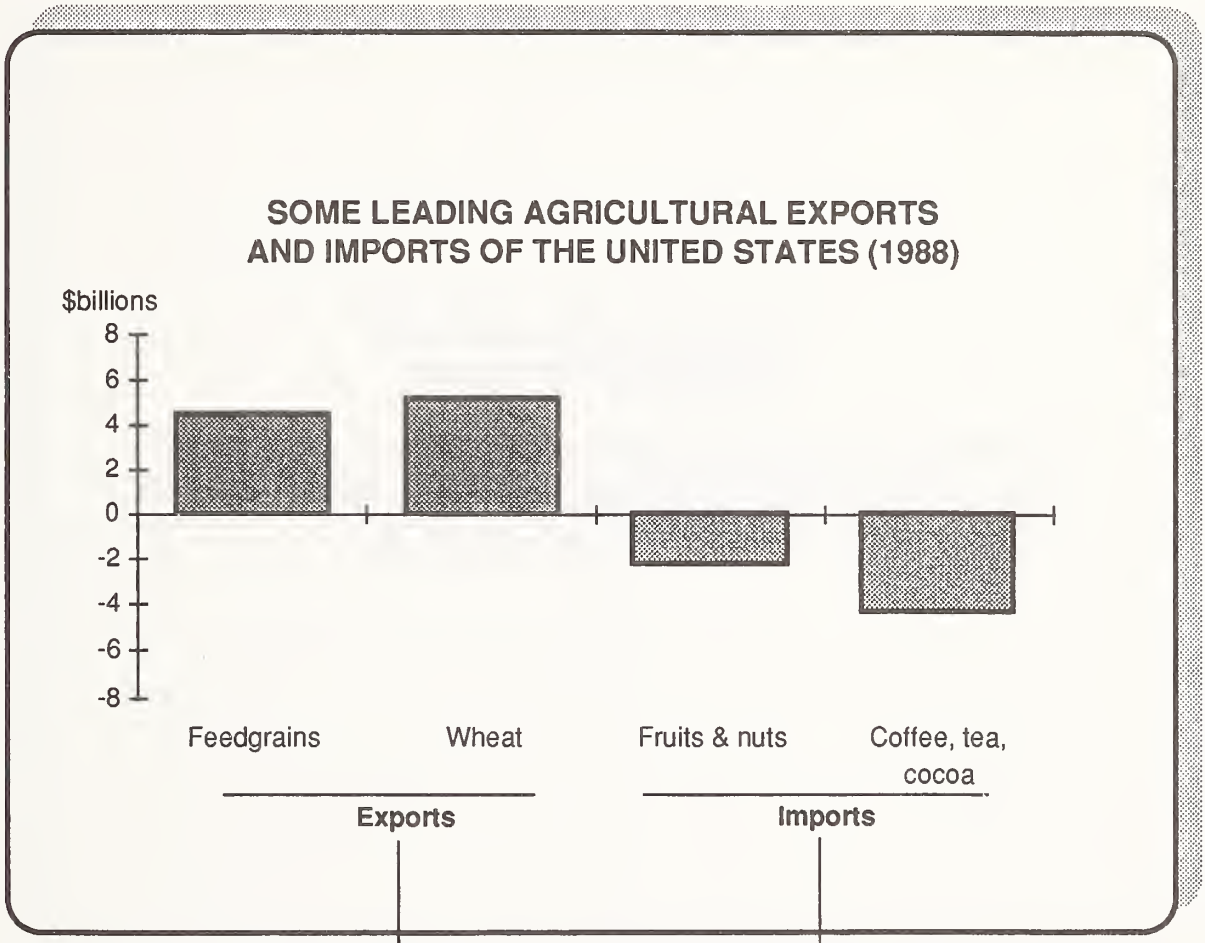
- "It is the maxim of every prudent master of a family never to attempt to make at home what it will cost him more to make than to buy."

- "What is prudence in the conduct of every private family can scarce be folly in that of a great kingdom. If a foreign country can supply us with a commodity cheaper than we ourselves can make it, better buy it of them with some part of the produce of our own industry, employed in a way in which we have some advantages."

Adam Smith's common sense idea of "advantages" is that everyone is better off if each person or nation produces what it is relatively most efficient at doing, and then trades those goods for things that other people and nations produce the best.

Question. How does the notion of comparative advantage apply to the real world today?

The concept of comparative advantage applies to the real world today only in a very broad sense. A country tends to produce and export the goods it produces most efficiently. In exchange, a country tends to import those goods at which it is least efficient — or at which other countries are more efficient in producing.



The United States has a comparative advantage in such commodities as feedgrains and wheat.

The United States does not have a comparative advantage in such tropical commodities as bananas, coffee, and tea.

Question. Does comparative advantage fully explain the total structure or pattern of agricultural exports and imports?

No, not fully. "Comparative advantage" is a broad theoretical statement about the basis for trade.

"COMPARATIVE ADVANTAGE"
TEXTBOOK DEFINITION

Specialization in production and the patterns of trade that would result on the basis of relative efficiencies with respect to resource use, in a world free of market distortions.

Market distortions arise from a failure of markets to establish prices for inputs and outputs of the production process that accurately reflect the value of those inputs and outputs to society. There are many types of imperfect or distorted markets, for instance: (1) Monopoly power, which is the ability of a single firm to control prices regardless of consumer demand, and (2) Government intervention, which is the action of governments to alter market signals being sent to producers and/or consumers.

Question. Which kind of imperfections or distortions are the most directly related to agricultural competitiveness?

Government policies that alter the economic environment faced by agricultural producers and/or consumers can have an important effect on agricultural competitiveness.

"COMPARATIVE ADVANTAGE"
TEXTBOOK DEFINITION

Specialization in production and the patterns of trade that would result on the basis of relative efficiencies with respect to resource use, in a world free of market distortions.

If government policies did not distort market functions, comparative advantage would make a strong basis for determining a country's competitiveness.

Question. But what happens in real life? What happens to patterns of trade when governments do intervene?

The concept of comparative advantage, with its emphasis on resource endowments, relative costs, and relative efficiencies, explains only part of the total structure and pattern of agricultural trade.

SHARE OF WORLD WHEAT EXPORTS

Year	United States	Saudi Arabia
	Percent	
1980	37	0.0
1987	30	0.5

Countries known to have strong fundamental advantages can find themselves losing competitive strength in the marketplace.

And countries not likely to have so-called "fundamental" advantages can find their market share increasing!

Question. What explains this kind of changing pattern? What are the other elements of competitiveness besides comparative costs and efficiencies?

To understand competitiveness more fully, we must move beyond comparative costs and deal with the effects of exchange rates and government policies.

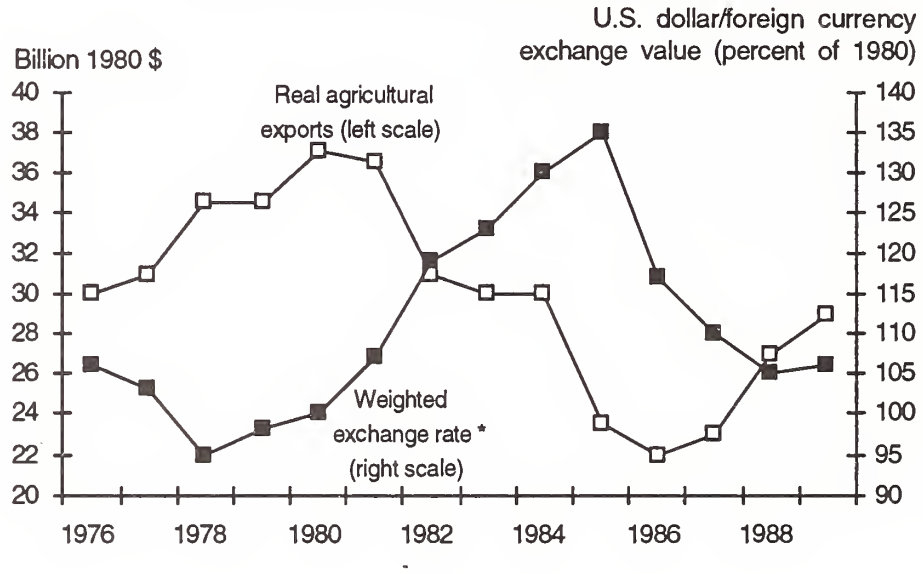
ELEMENTS OF AGRICULTURAL COMPETITIVENESS

- Comparative costs -- relative efficiency, or what economists refer to as comparative advantage
- Exchange rates -- a part of what economists call the macroeconomic environment
- Policies -- including agricultural and trade policies, both domestic and foreign

These two elements often act to distort trade patterns that would naturally result from underlying differences in relative costs and efficiencies. When these elements also change the pattern of domestic investment, then the structure of international "comparative advantage" itself can be changed.

Question. We have seen earlier that changes in exchange rates can alter cross-country comparisons of (soybean) production costs. But how strong an effect can exchange rates have on a nation's overall competitiveness?

Exchange rates can be a very powerful element of overall agricultural competitiveness, as shown by the chart below. A country's monetary and fiscal policies can influence interest rates, change the exchange rate, and thus directly affect overall agricultural competitiveness.

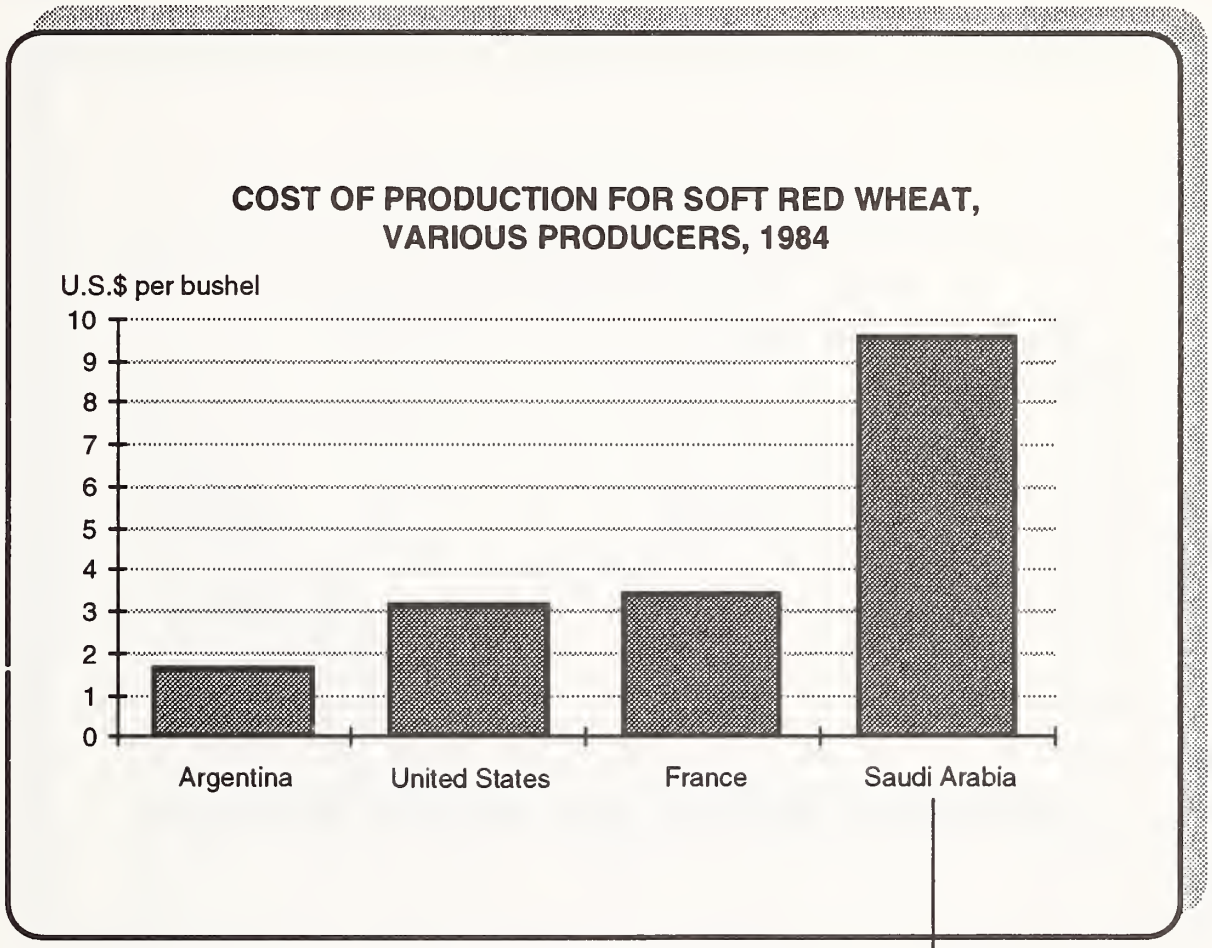


*Value of U.S. dollar relative to a "basket" of foreign currencies.

The inverse relationship is clear: The higher the value of the dollar, the more costly U.S. farm products are to foreign buyers, and the lower the volume and value of U.S. agricultural exports — and vice versa.

Question. The final element of agricultural competitiveness is policies. How strong can the effect of policies be?

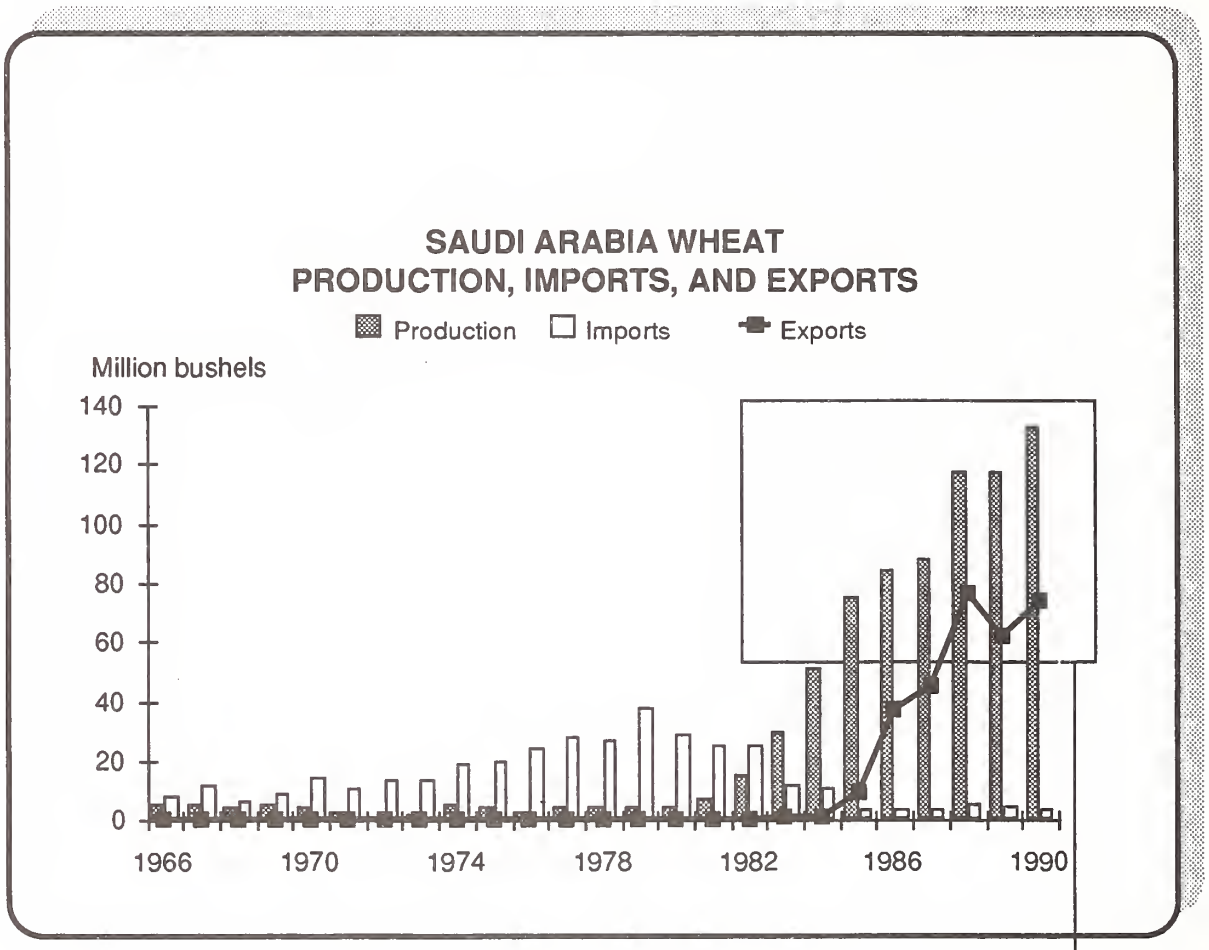
Policies can be every bit as powerful as costs and exchange rates. Let's consider in more detail the case of Saudi Arabia's increasing market share of world wheat trade. As shown below, Saudi Arabia is actually a high-cost producer of wheat.



Saudi Arabia does not have strong natural advantages in wheat production. Therefore, its cost of production is much higher than that of most other countries.

Question. How can Saudi Arabia overcome its cost disadvantage in wheat production? Could the disadvantage be offset by means of government policies?

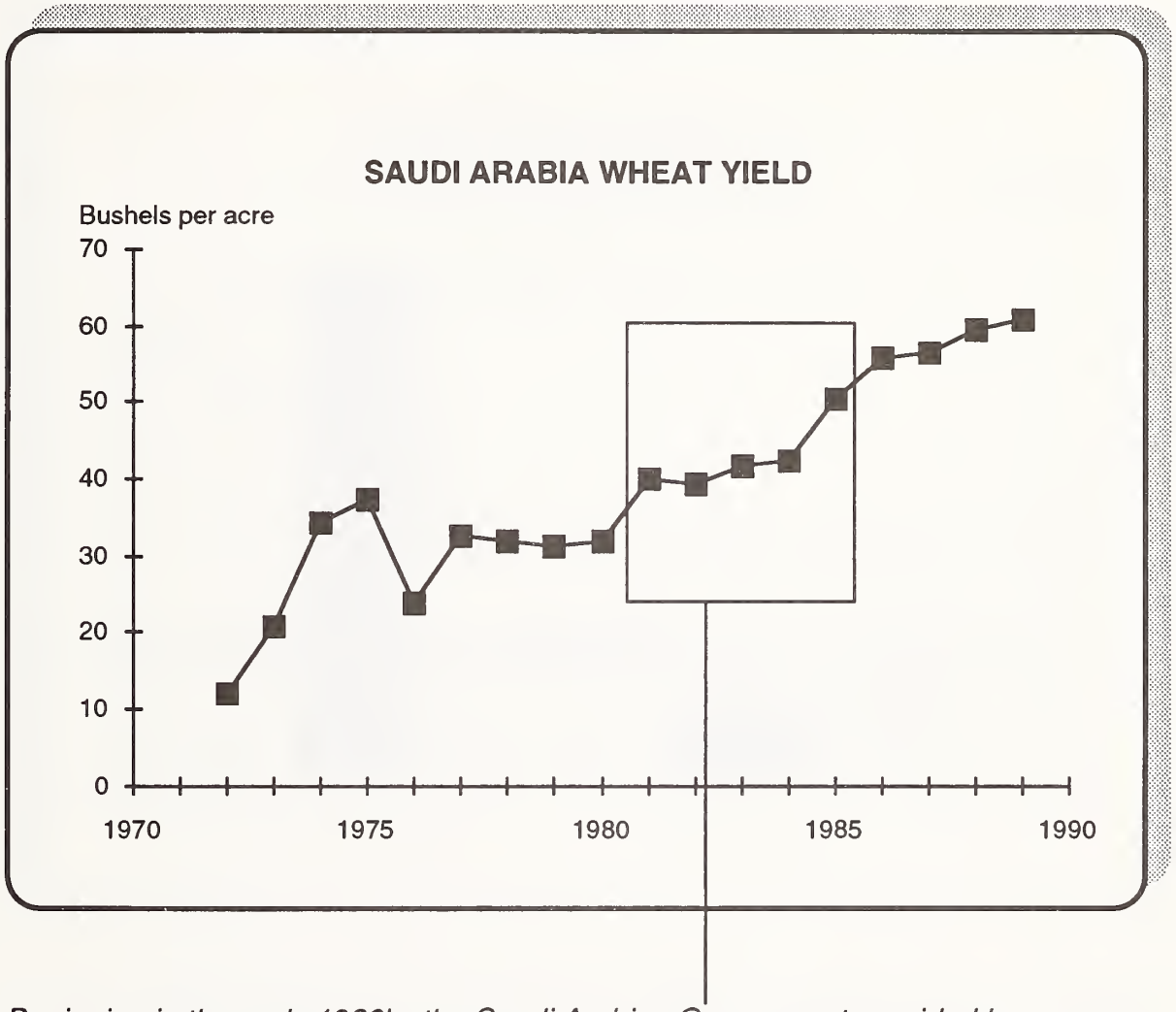
Yes, the effect of domestic policies can be enormous. The chart below shows what has happened to Saudi Arabian wheat in the past two decades.



Policy motives for increased wheat production included food security and adding money from oil revenues to the rural economy.

Question. How was Saudi Arabia able to make such a dramatic change in wheat production?

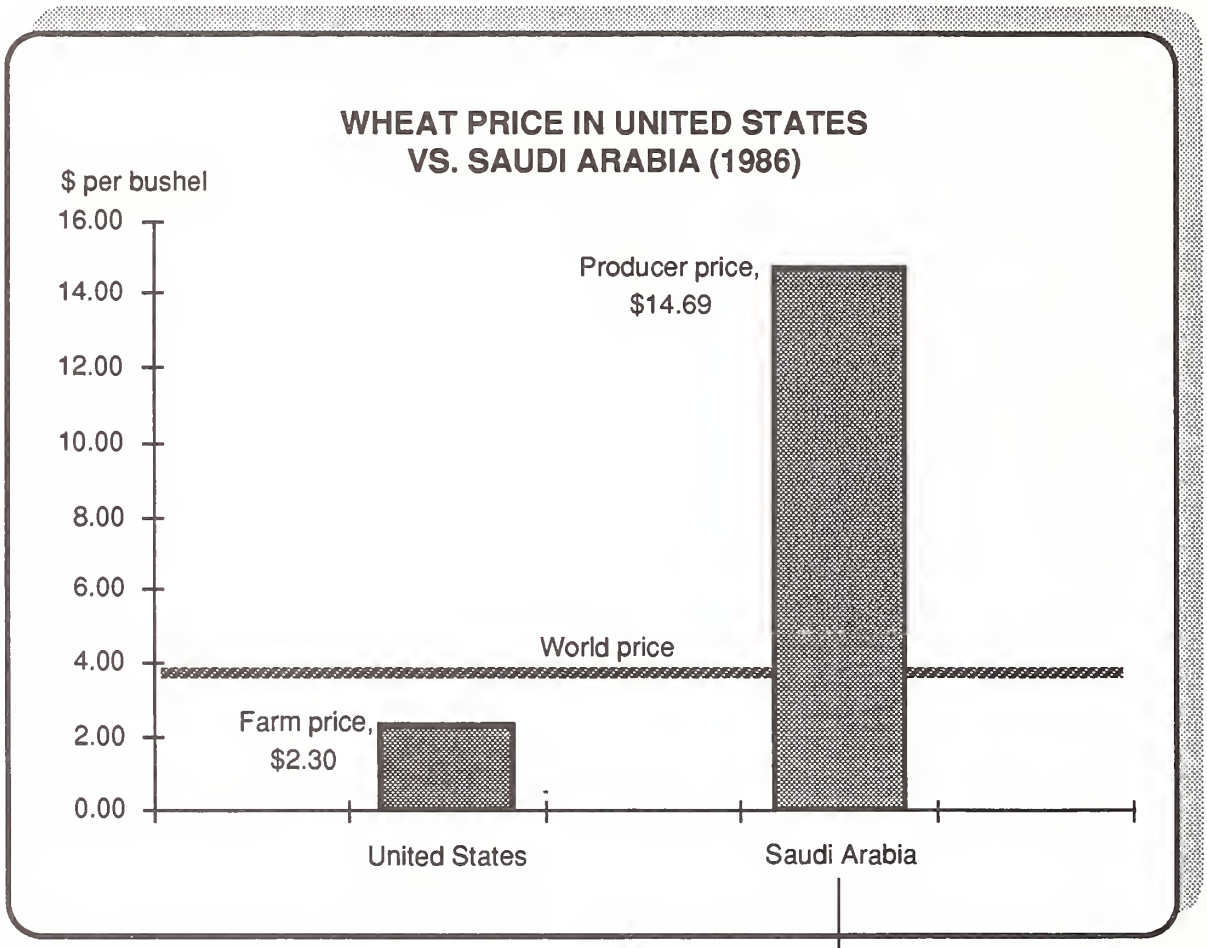
Saudi Arabia's dramatic gains in wheat production were enabled by government policies which had both short- and longrun effects on efficiency, productivity, and thus "competitiveness."



Beginning in the early 1980's, the Saudi Arabian Government provided large amounts of capital for construction of new irrigation systems, adoption of modern production techniques, and the overall improvement of its agricultural infrastructure. The policies that fostered this long-term investment enabled efficiency and productivity to improve, and wheat yields doubled between 1980 and 1989. Saudi Arabia's so-called "comparative advantage" in wheat production has been altered by these policies.

Question. In addition to government-led capital investment in agriculture, what other kinds of policies were instrumental in the wheat production increase?

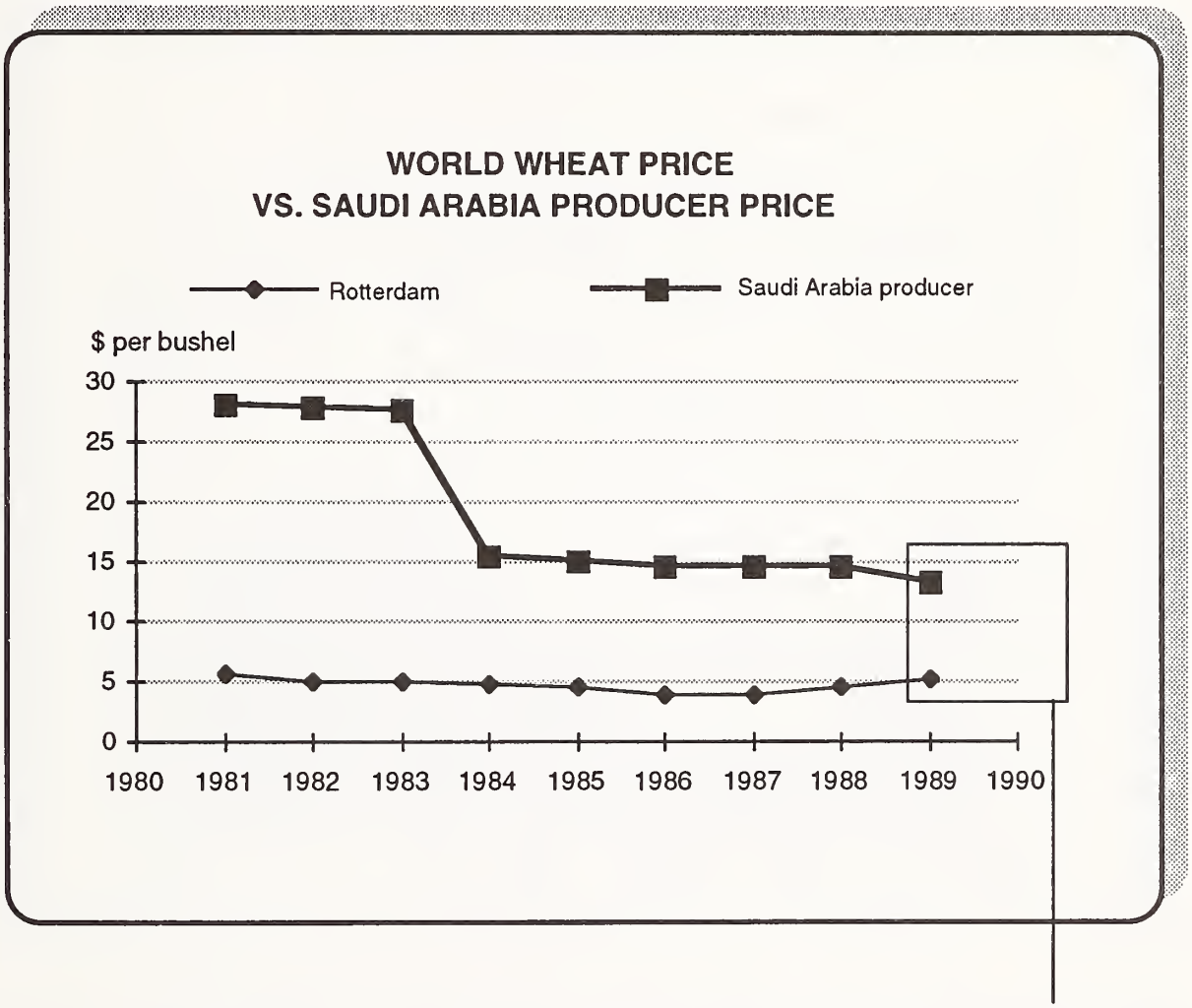
Saudi Arabia's dramatic gains in wheat production were also enabled by short-term (year-to-year) policies which provided strong incentives for producers to make intensive use of the capital investments already mentioned — namely, policies which set a very high price for domestic producers and subsidized inputs such as seed, fertilizer, and water.



The Saudi domestic price of wheat was at one point over <u>four</u> times the world price. Government-led investment, direct price supports, and other subsidies have literally turned the desert green.

Question. How long can a country maintain such high prices and subsidies?

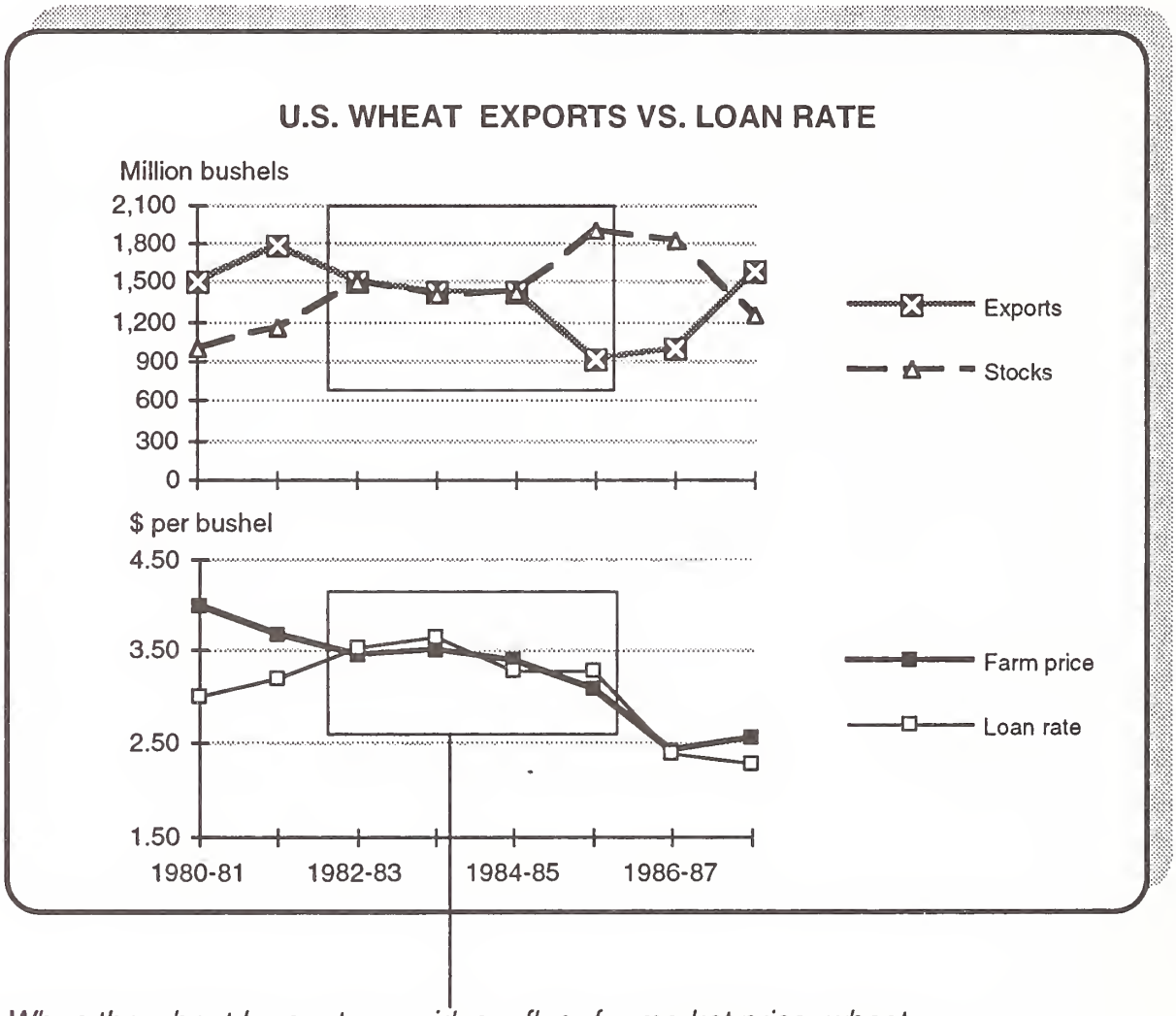
Saudi Arabia has maintained its high producer price of wheat for over a decade, and it can continue to do so for as long as the policy is attractive in terms of achieving the objectives of food security and maintaining a buoyant rural economy — and so long as money is available. The latter has become an increasingly burdensome budgetary problem for many countries in Europe, Asia and North America, where expenditures in support of producers are high.



Saudi Arabia's cost of subsidizing wheat production and exports is about $2 billion per year, which includes capital for irrigation, storage and handling facilities, research, and other improvements. In the long term, Saudi policy has altered the pattern of rural investment, and has essentially masked its underlying comparative disadvantage in wheat production; in the short term, the use of export subsidies has distorted the pattern of world trade.

Question. Do farm policies in the United States affect the competitiveness of U.S. agricultural producers?

The United States provides a system of price and income support to its grain producers. But at times these support policies have tended to dampen our competitive position, as in the case of wheat below.

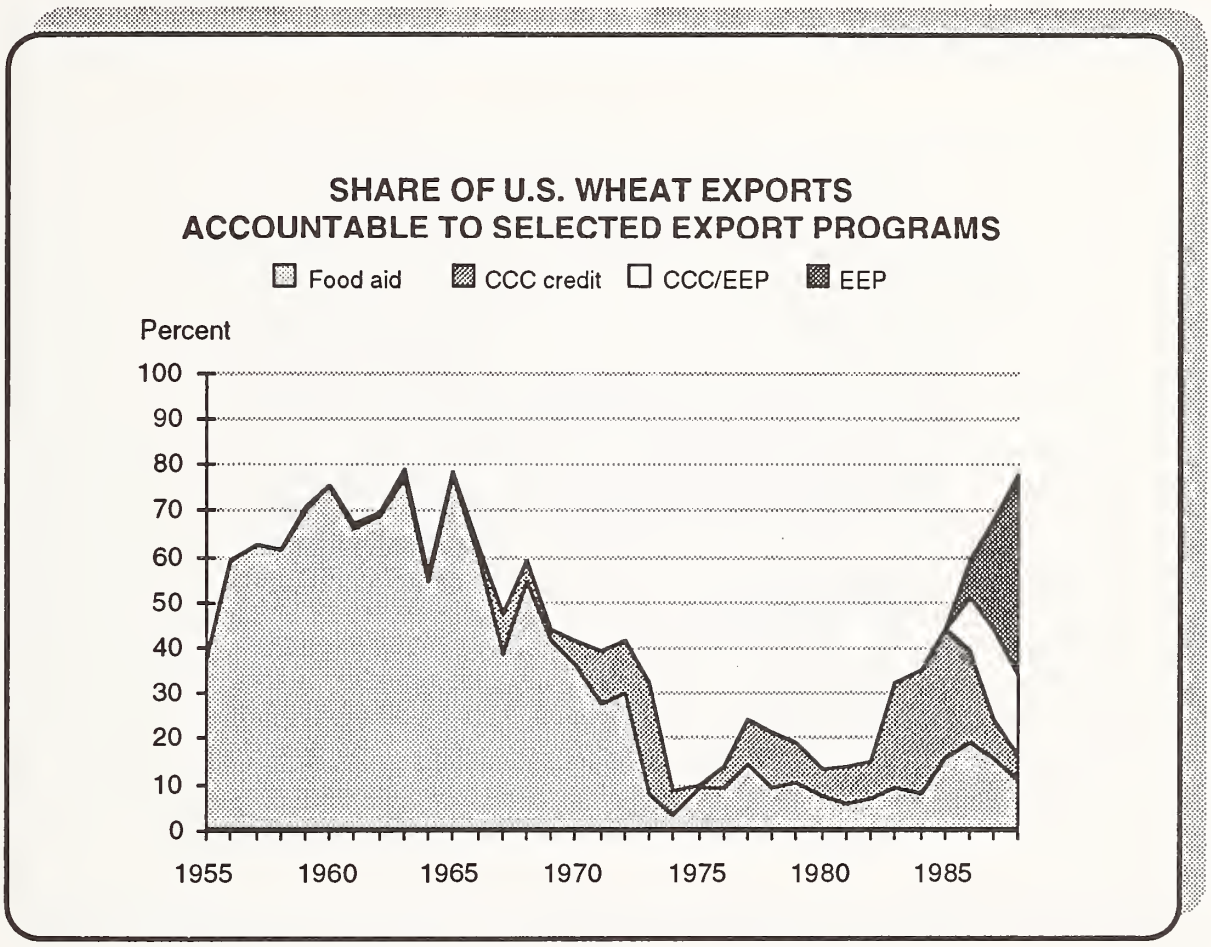


When the wheat loan rate provides a floor for market price, wheat production tends to go under loan (into stocks) and U.S. exports fall, as does the U.S. share of world markets. An old adage of economics is, "When prices won't adjust, quantities will."

When loan rates were lowered, the U.S. competitive position improved—exports and market share increased.

Question. In addition to the lower loan rates, what other policy mechanism of the United States is credited with helping the country recapture export market share?

The U.S. Export Enhancement Program (EEP) and other export programs have helped the United States recapture export shares lost in the early to mid-1980's.



In the late 1980's, nearly 80 percent of U.S. wheat exports were shipped under some type of government export program. U.S. export share of the global wheat market increased to 42 percent by 1988, from 27 percent in 1985. (While various recent studies differ on the magnitude of impact, they all agree that export programs did indeed contribute to increased U.S. market share.)

Question. What other policies besides loan rates, subsidies and export assistance programs can affect competitiveness?

The types of agricultural and trade policies that affect competitiveness are as diverse as the dozens of nations which formulate and apply them.

POLICY MECHANISMS WHICH AFFECT AGRICULTURAL COMPETITIVENESS

Market price support
- Border measures
- Export taxes
- Two-price system
- Price premiums
- Domestic price supports
- Marketing board activities
- State trading options

Direct income support
- Deficiency payments
- Producer levies
- Income stabilization funds
- Crop insurance

Controlled exchange rates

Marketing subsidies
- Transportation subsidies
- Marketing programs
- Inspection services

Assistance to inputs
- Fertilizer subsidies
- Fuel tax exemptions
- Concessional credits
- Irrigation subsidies

Assistance to long-term production
- Research and extension
- Conservation programs
- Structural programs

The net effect of the many diverse national policies on performance of the agricultural sector and on the structure and performance of world markets has been highly distortive. For example, by one estimate, if governments of the industrialized countries removed all distortive policies, the EC would switch from being an exporter of meat to being one of the largest importers. The same would be true of rice in Japan. Governments, it seems, can always pour money into export subsidies or other programs and buy competitiveness. But such masking of underlying comparative advantages/disadvantages leads to a host of problems, including excess productivity, low world prices, and high government costs.

Question (Review). What are the three main elements of agricultural competitiveness, and which one is most important?

The three main elements of agricultural competitveness in the 1980's have been comparative costs, exchange rates, and government policy. All three of the elements are important, but in the 1980's government policy has received perhaps more attention than ever before.

ELEMENTS OF AGRICULTURAL COMPETITIVENESS

- Comparative costs -- relative efficiency, or what economists refer to as comparative advantage
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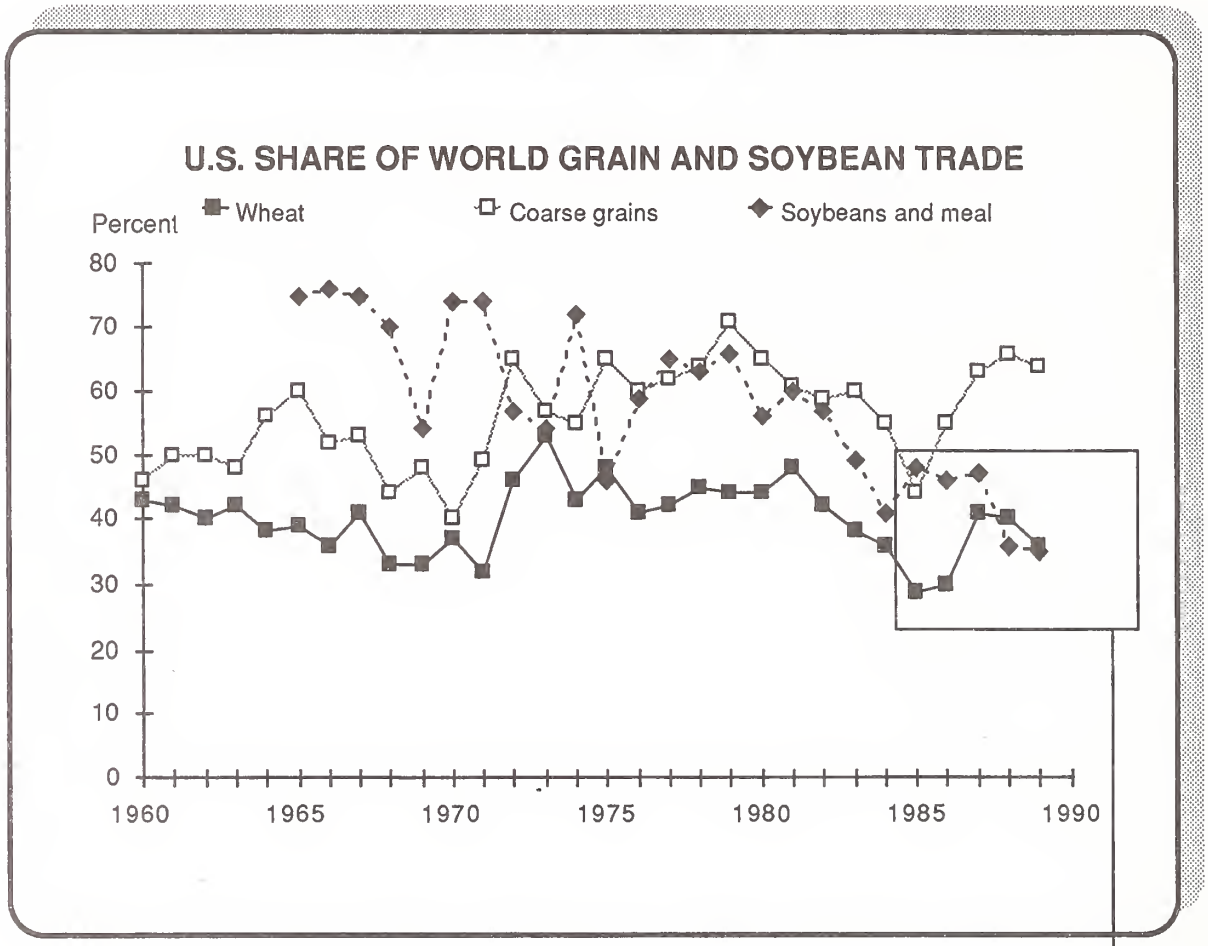
These two elements often act to distort trade patterns that would naturally result from underlying differences in relative costs and efficiencies. When these elements also change the pattern of domestic investment, then the structure of international "comparative advantage" itself can be changed.

Question. How can agricultural competitiveness be measured?

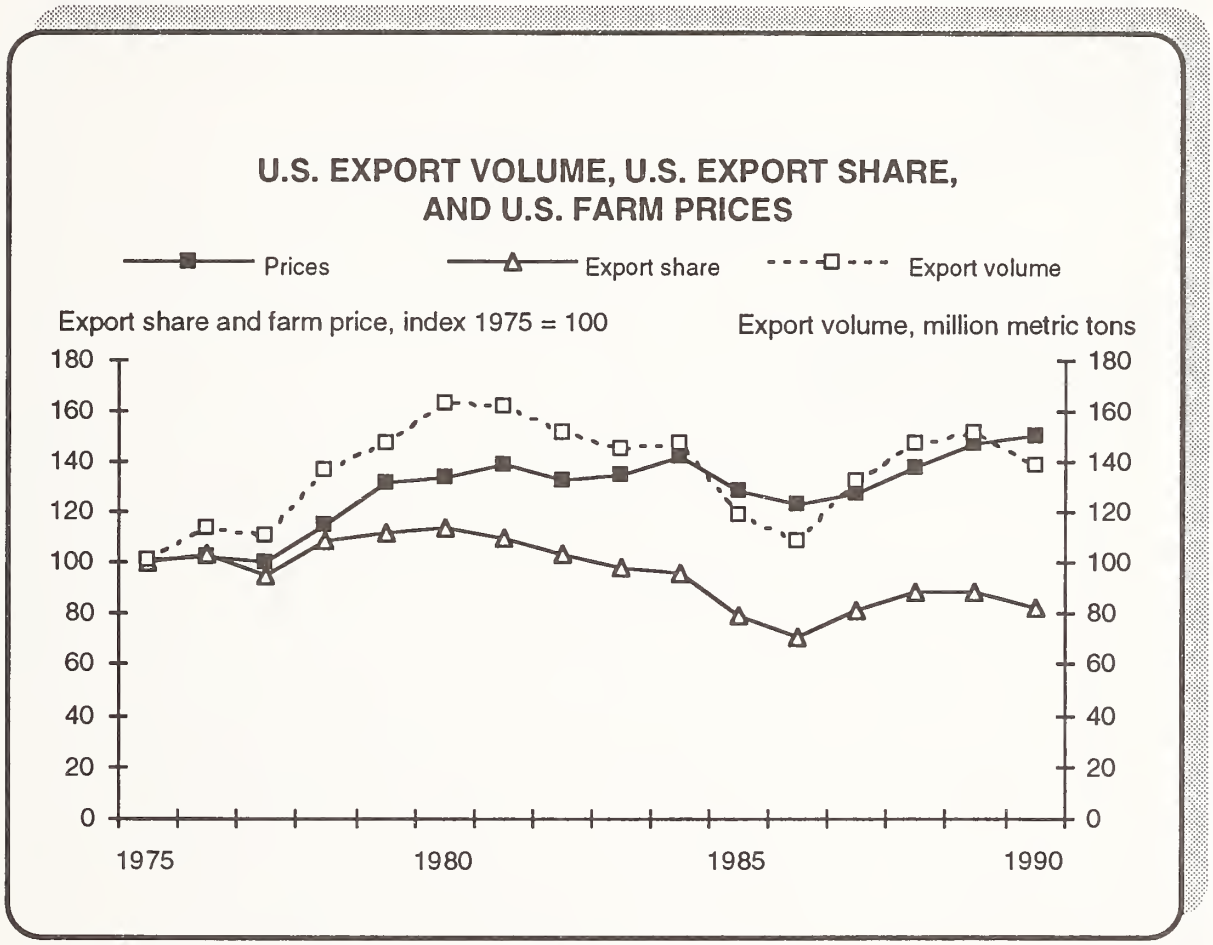
There is no quick and simple method for judging agricultural competitiveness. However, one useful (after-the-fact) measure is the history of a country's market share. Movements in market share tell us how well we are competing against other exporters of the same commodity.



A country can be said to have difficulties with its competitiveness if it loses market share from its longrun levels. (More information on these trends will be given in Part Three, History.)

Question. Does a country's international competitiveness have an effect on its domestic farm income?

Yes. A country's competitive position in global markets affects levels of trade, which in turn have implications for the strength of farm prices and incomes — those factors that determine "competitiveness," profitability, and income at the farm level.



The above graph shows the relationship between the strength of our competitive position externally and the prices (and thus the profitability) of our agriculture internally. When export volume and market share increased, in the late 1970's and early 1990's, prices increased. Prices fell in the mid-1980's when export volume and market share dropped sharply.

In the next part, we will move from economics and policy to the geography of agricultural competitiveness, and then in the final part to its history.

The Basic
Elements of
Agricultural
Competitiveness

PART TWO. GEOGRAPHY

In the next 27 pages, we will divide the world into a dozen or so geograhical units and then briefly examine the "relative efficiency" of these units — in terms of land, labor, capital, technology, and (indirectly) policy. We will also divide present world agricultural trade into several product categories, and then examine which of the geographical regions leads the world in exports and imports of the products.

WORLD'S MAJOR LAND MASSES

The above map includes land of all kinds, including frozen tundra, mountains, deserts, and jungles — much of which is not well suited to the production of crops.

Question. Which countries have the most actual cropland? (Name the top three.)

In terms of millions of hectares of cropland, the three largest countries are: (1) the former Soviet Union, 233; (2) the United States, 190; and (3) India, 170 (shown below as part of South Asia). But pasture land is also important, and some land is used in either category depending on relative prices and weather conditions.

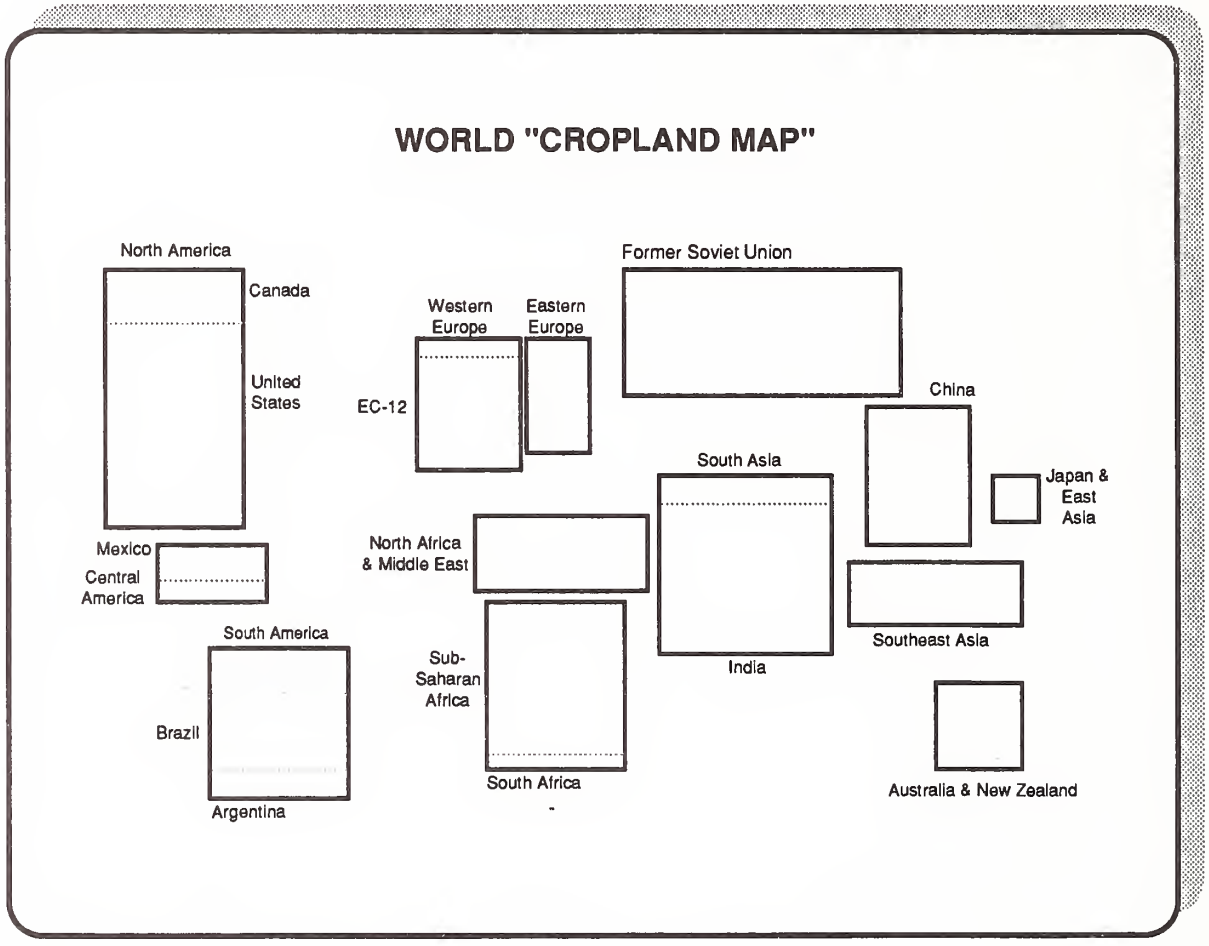
WORLD CROPLAND AND PASTURE LAND (1988)

Region or country	Cropland		Pasture land	
	Million hectares	Percent of world	Million hectares	Percent of world
North America	236	16	274	9
United States	190	13	241	8
Canada	46	3	32	1
Central America (incl. Mexico)	38	3	94	3
South America	141	10	476	15
Western Europe	87	6	62	2
Eastern Europe	53	4	21	1
Former Soviet Union	233	16	372	12
Sub-Saharan Africa	160	11	681	21
North Africa & Middle East	92	6	311	10
South Asia (incl. India)	204	14	20	1
Southeast Asia	76	5	16	1
China	96	7	319	10
East Asia (incl. Japan)	11	1	124	4
Australia & New Zealand	48	3	438	14
World	1,474	100	3,209	100

The world has over twice as much pasture land as cropland. Large amounts of pasture land provide an advantage to countries such as Australia in the efficient production of livestock.

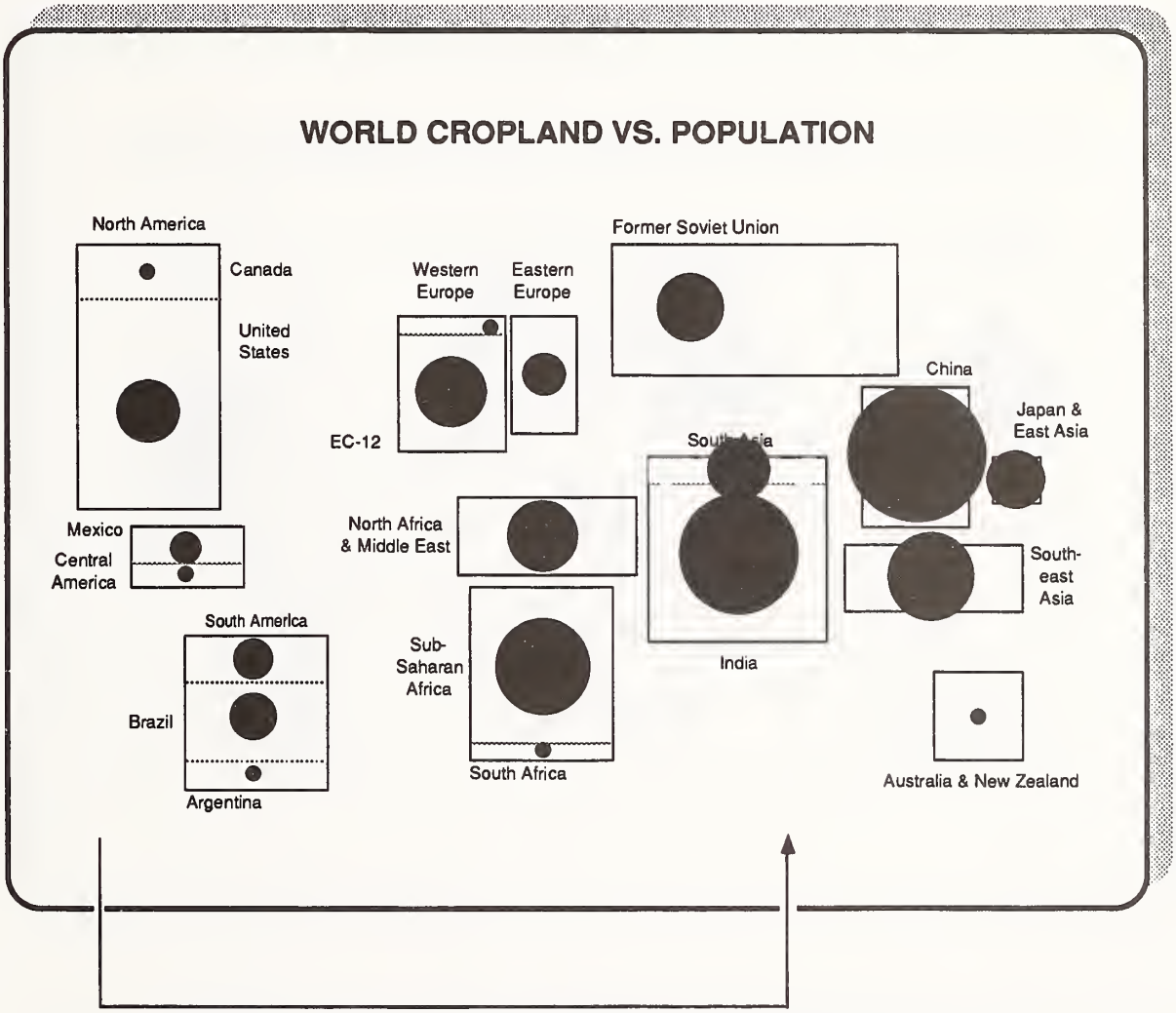
Method. In the following pages, the 13 main regions above will be displayed relative to their 1988 quantities of cropland. See next page.

Each rectangle below has an area proportional to the amount of cropland listed in the previous table. The purpose of this schematic is to permit the easy display of other factors besides land — such as population, labor, technology, and other resources.



Question. Which regions in the above schematic have the greatest populations to feed?

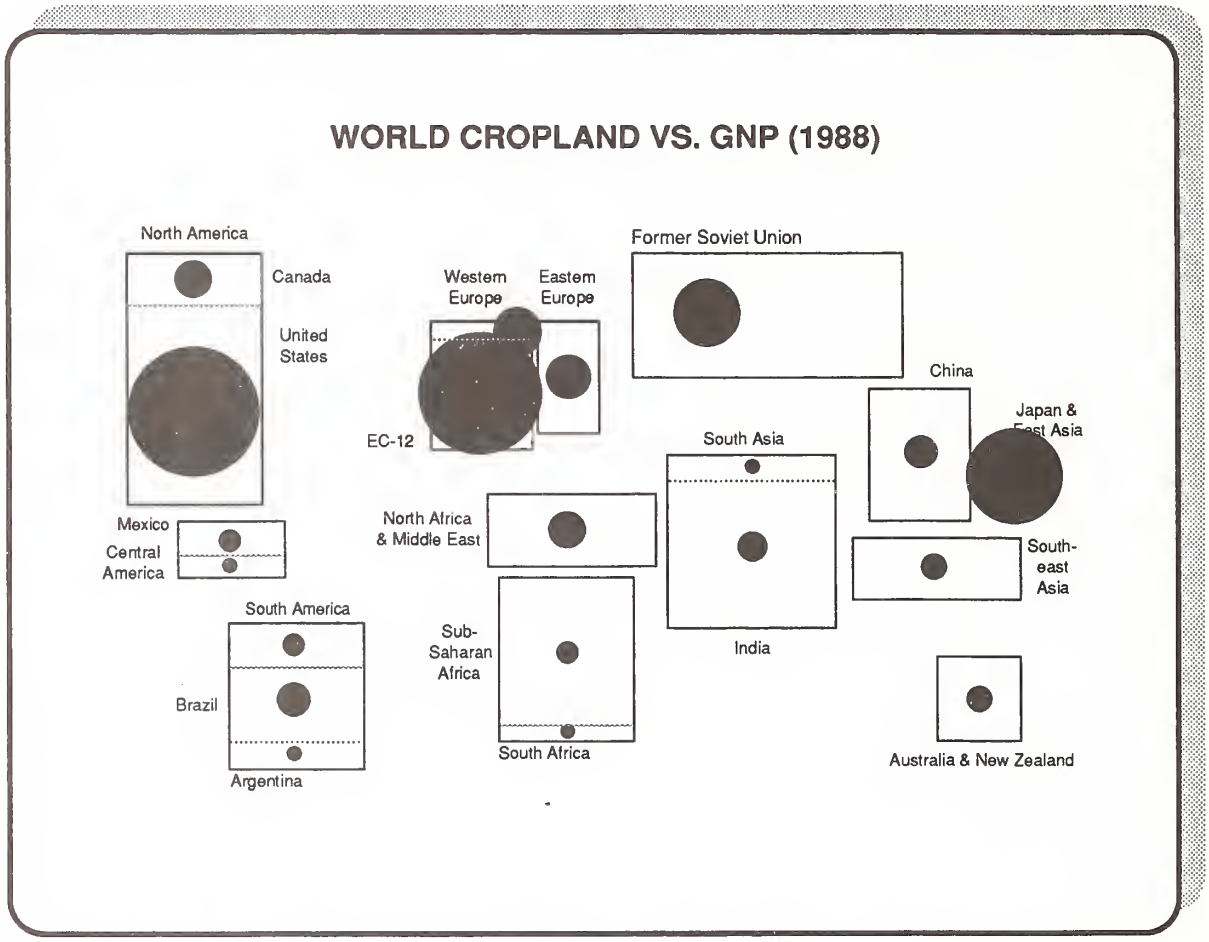
The highest ratios of population to cropland occur in the Orient — India, China, Japan, and the rest of Asia. The lowest ratios of population to cropland are in North America and Australia/New Zealand.



Regions with small populations but large amounts of cropland can be said to have a "natural advantage" in the production of crops for export to other regions. But is this the only consideration that the regions face in being "agriculturally competitive"?

Question. What other factors besides the ratio of population to available cropland will affect the pattern of competitiveness and trade between regions?

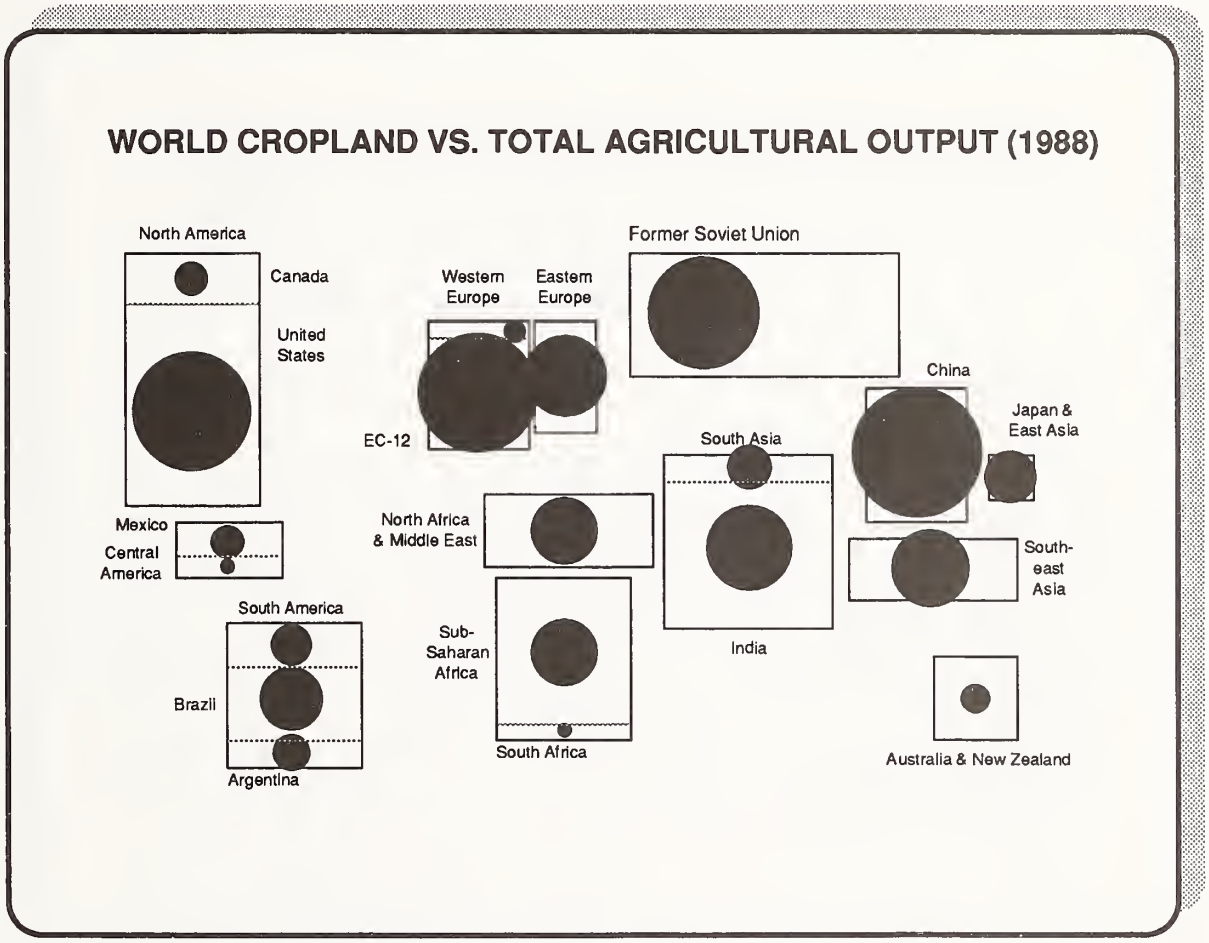
One main factor which affects world agricultural trade is "money," or the <u>relative income levels</u> between regions.



Economic activity in a region affects not only how much food is imported and consumed but in what form (bread vs. meat, etc.). Economic activity also affects policies, which in turn can completely change a region's "natural advantages" — as in the case of Saudi Arabia's wheat production, discussed in the first part of this booklet.

Question. Name another factor besides income that affects the agricultural output of any geographical region.

Latitude, climate, and soil type affect agricultural output. The yields of most important crops are highest in the mid-latitudes, where rainfall is plentiful and the soils are richest.



The effect of relative yields can be seen in the case of China and the EC-12, which have less cropland than the United States or the former Soviet Union (in terms of the number of acres) but greater total outputs due to higher yields.

Question. Name yet another factor besides income, latitude, climate, and soil type that affects the agricultural output of any geographical region.

Technology can make big changes in the productivity of any region's cropland. One early technology to do this is irrigation.

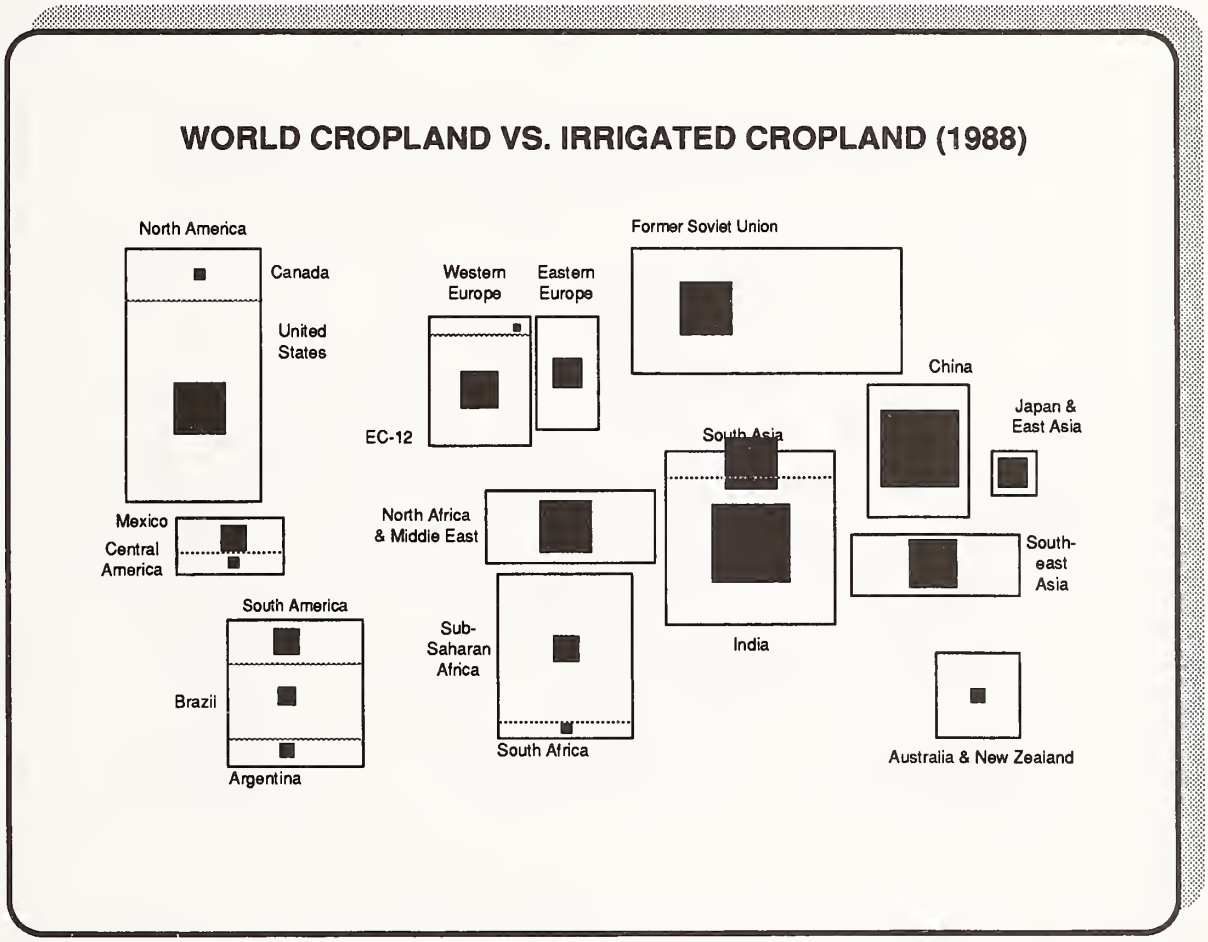
WORLD CROPLAND AND IRRIGATED CROPLAND (1988)

Region or country	Cropland		Irrigated cropland	
	Million hectares	Percent of world	Million hectares	Percent of world
North America	236	16	19	8
United States	190	13	18	8
Canada	46	3	1	0.4
Central America (incl. Mexico)	38	3	7	3
South America	141	10	9	4
Western Europe	87	6	11	5
Eastern Europe	53	4	6	3
Former Soviet Union	233	16	20	9
Sub-Saharan Africa	160	11	6	3
North Africa & Middle East	92	6	19	8
South Asia (incl. India)	204	14	62	27
Southeast Asia	76	5	16	7
China	96	7	44	20
East Asia (incl. Japan)	11	1	6	3
Australia & New Zealand	48	3	2	1
World	1,474	100	227	100

Over half the world's irrigated cropland is in the Orient. Regions with high populations apply technology to boost the land's natural productivity.

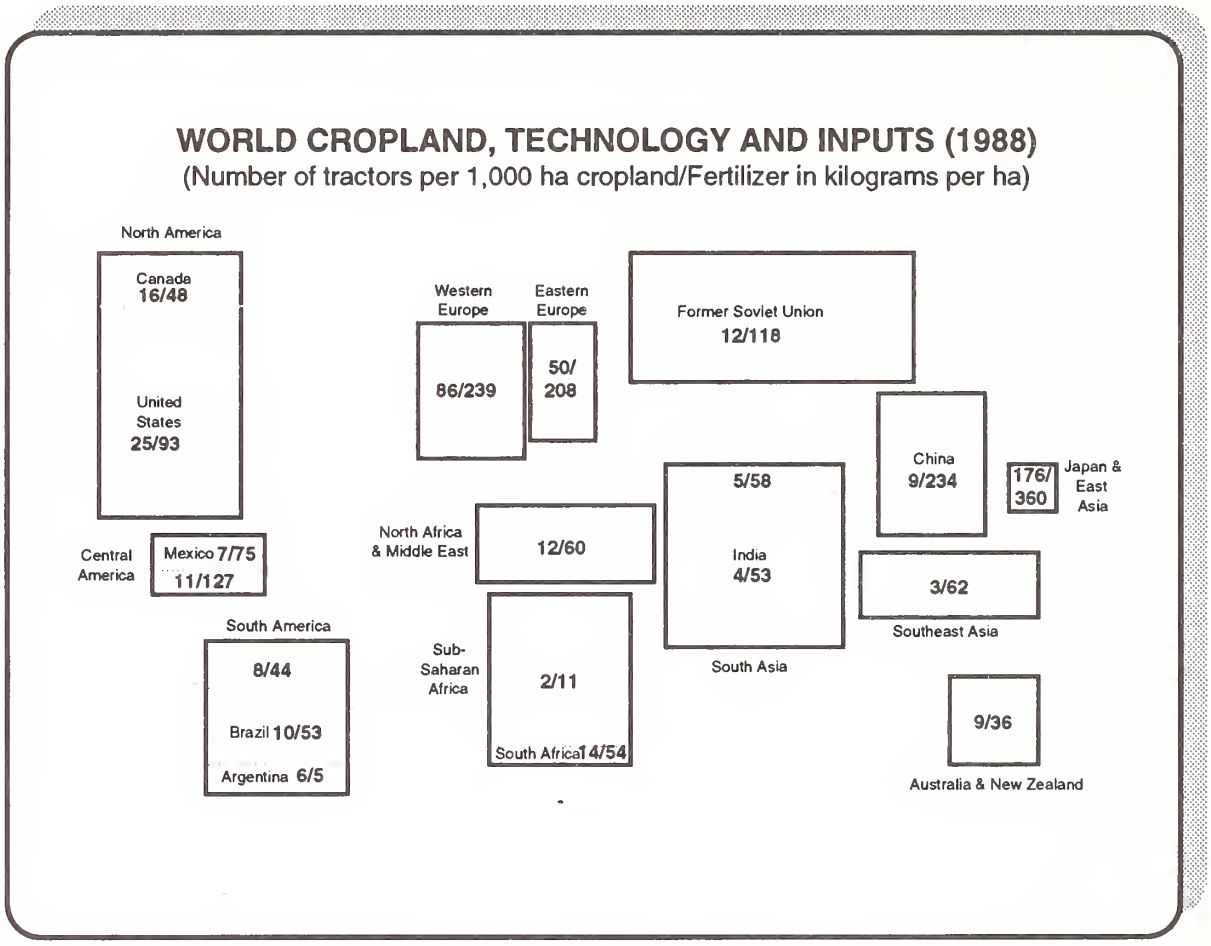
The diagram on the next page plots the above data on cropland and irrigated cropland by region.

Nearly a third of India's cropland, and nearly half of China's and Japan's cropland is irrigated. Less than 10 percent of cropland is irrigated in Canada, the United States, and the former Soviet Union.



Question. Which regions lead the world in the application of such technologies as mechanization (e.g., tractors) and fertilization?

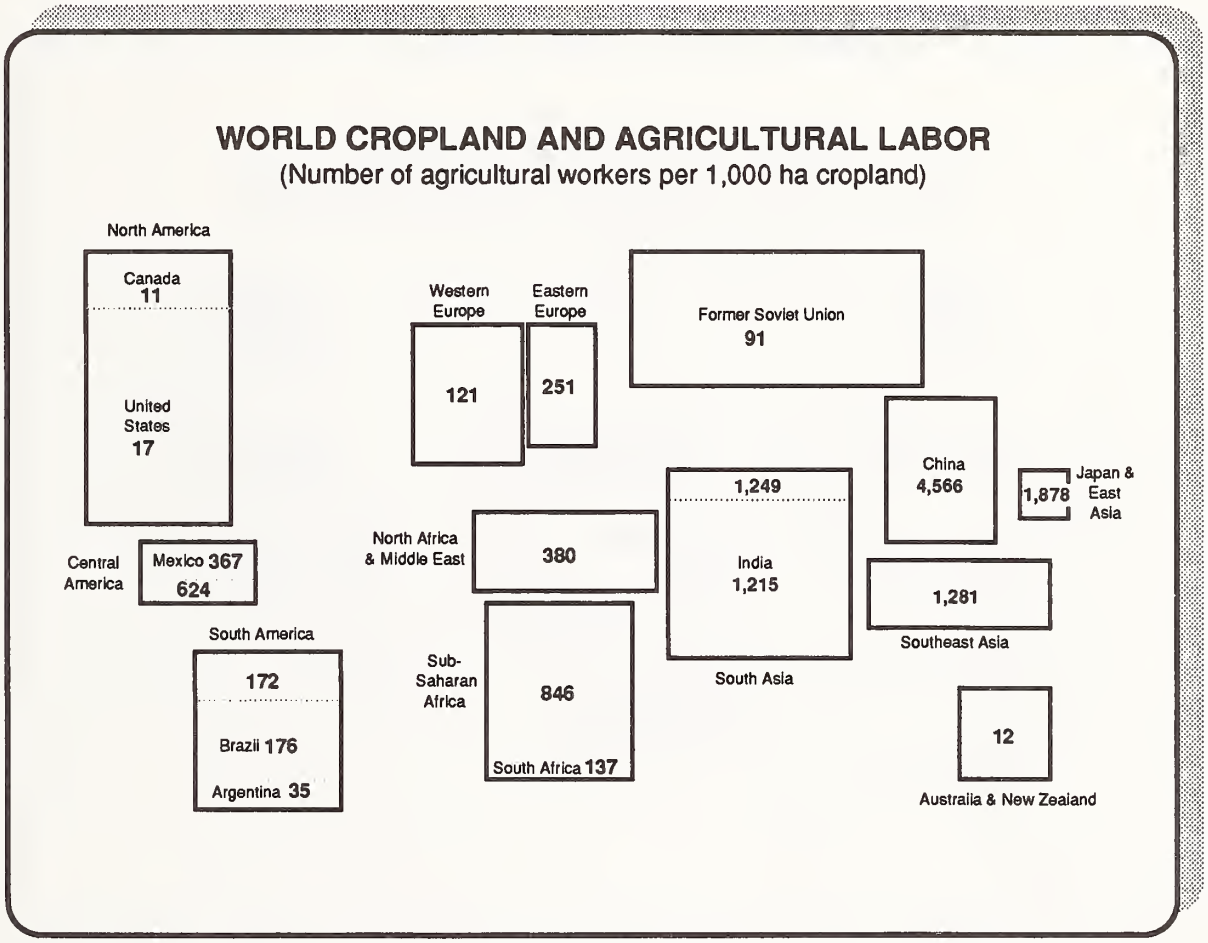
Western Europe has a very high level of both mechanization and fertilization, as do Eastern Europe and the United States, but the highest levels are in Japan. These regions can be termed "capital abundant" compared, for instance, to Africa and South Asia, and the agriculture of these regions is likewise "capital intensive."



Note that many regions, such as the former Soviet Union and China, have higher fertilization figures than does the United States. The fertilization figures above, however, do not reflect the balance between the major nutrients or how well the material is matched to soil types and terrain, or the availability of moisture (rainfall or irrigation) required to effectively use higher application rates.

Question. Which regions apply the most labor to agricultural production?

The highest labor input to agricultural production per hectare is in China, but the rest of Asia and Africa are also "labor abundant."



Question. Is there a general correlation between the kind and amount of resources used (land, labor, capital, and technology) in producing agricultural products and the relative <u>value</u> of these products?

Yes. Lower value commodities such as wheat are generally associated with the use of large amounts of land. Conversely, higher value commodities such as meat and milk are generally associated with more labor, capital, and technology.

RESOURCE REQUIREMENTS BY AGRICULTURAL PRODUCT VALUE CATEGORIES

Most land-intensive ← → **Most labor- and capital-intensive**

Low-value commodities	Medium-value commodities	High-value commodities
Cereals Wheat and flour Rice* Corn Other feedgrains Oilseeds Soybeans Sunflowerseed Rapeseed Others Fibers Cotton Live animals*	Vegetables Fruits Nuts Tobacco Sugar Vegetable oils Oilseed meals	Meat products Dairy products and eggs Fruit & vegetable juices Wine and beer

**Can be labor intensive in some regions. For instance, irrigated rice production in China is very labor intensive.*

Question. Can the agricultures of the world's geographical regions be neatly placed in the categories of "land-intensive," "labor-intensive," and "capital-intensive"?

No, not neatly, because the agriculture of any given region is bound to have some subregions in which all three categories of resources are abundant (or scarce). However, we can arrange the regions in a very general way as follows.

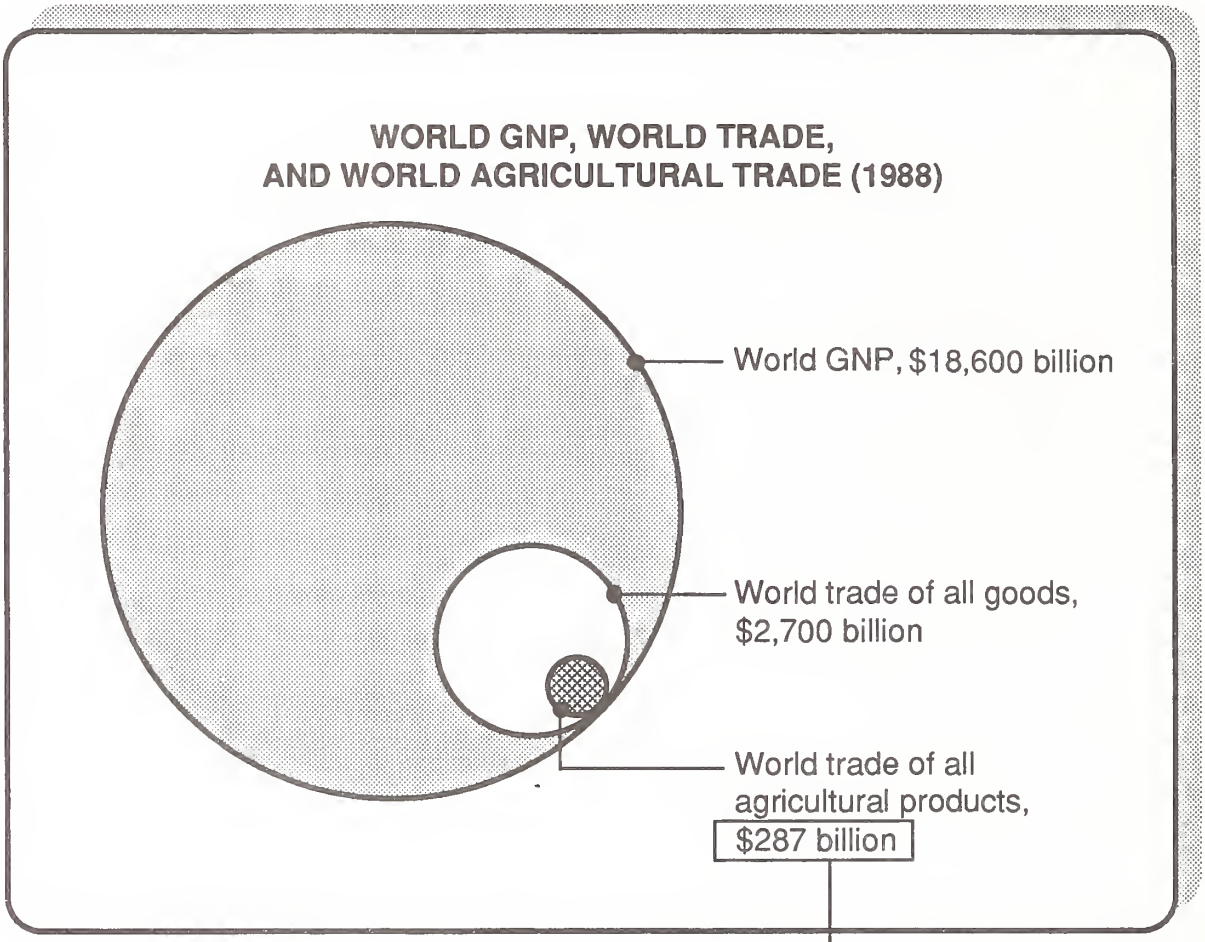
RESOURCE AVAILABILITY TO AGRICULTURE VS. GEOGRAPHICAL REGIONS (GENERALIZED)

Land abundant	Labor abundant	Capital abundant
United States Canada Western Europe, excluding EC-12 Former Soviet Union Australia/New Zealand South Africa	China India Japan Southeast Asia Africa Central America Mexico North Africa and Middle East	United States Canada EC-12 Australia/New Zealand Japan North Africa and Middle East (oil-rich portions)

Note that several regions with abundant land also have abundant capital — for instance, the United States, Canada, and Australia/New Zealand.

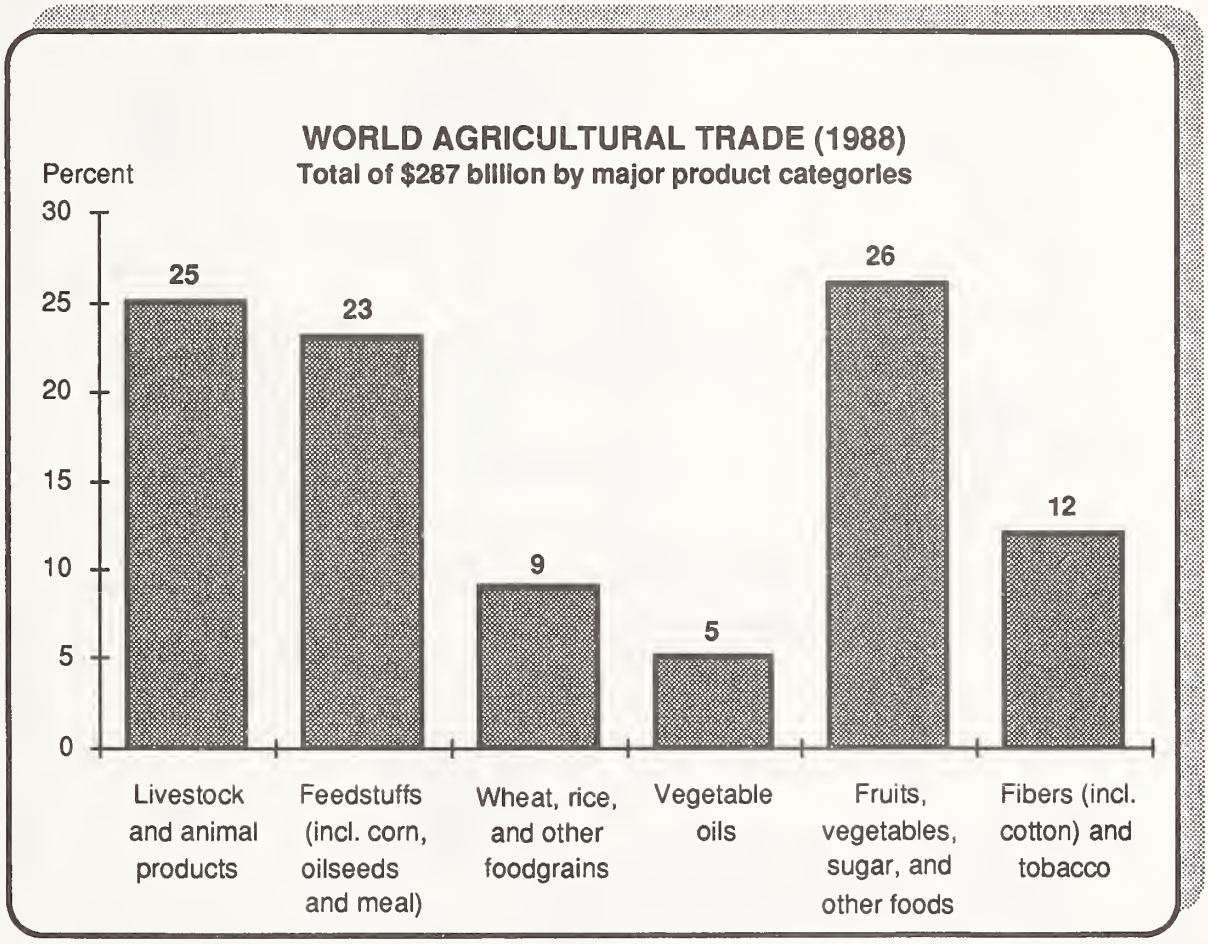
Question. What is the scope of agricultural trade in overall world economics? How large is trade in agricultural products versus trade in goods of all kinds?

About 15 percent of all the goods produced in the world enter into world trade. About 8 percent of world trade of all goods is agricultural.



Trade in agricultural products is made up of hundreds of different commodities, ranging from corn and wheat to live animals, vegetable oils, fruit, cotton, and tobacco.

We will use the following six categories of agricultural products to display market share of world agricultural trade.



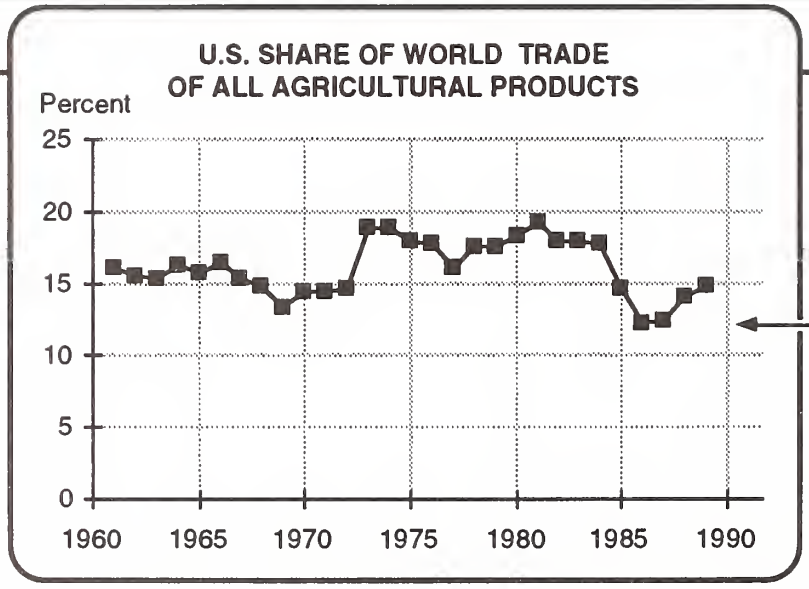
Question. (Take a guess.) Which geographical region is the leading exporter of total agricultural products (all six of the above categories combined)? And which region is the leading importer?

WORLD TRADE IN TOTAL AGRICULTURAL PRODUCTS

Percent of exports/imports, 1988 (Data displayed on map at right)

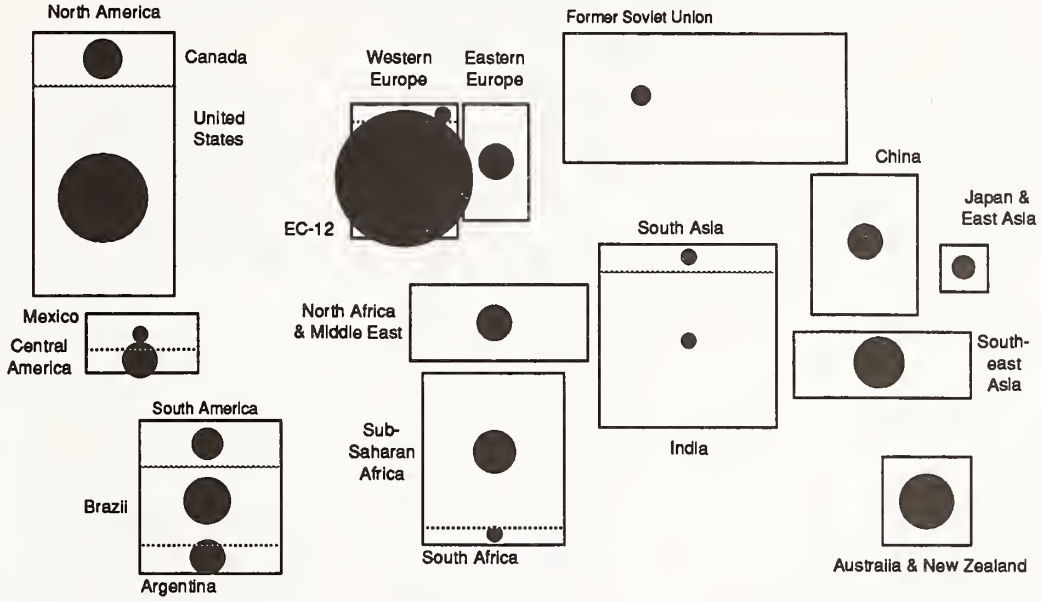
Region	Exports	Imports
North America	19.4	8.4
United States	15.9	6.9
Canada	3.5	1.5
Central America & Caribbean	4.9	2.2
Central America	2.2	1.3
Mexico	0.9	1.1
Caribbean	2.7	0.9
South America	9.2	1.6
Brazil	4.4	0.3
Argentina	2.6	0.1
Western Europe	38.2	44.8
EC-12	37.2	41.7
Eastern Europe	3.1	3.7
Former Soviet Union	1.1	7.2
Sub-Saharan Africa	4.4	2.2
South Africa	0.4	0.3
North Africa & Middle East	2.7	9.9
South Asia	1.6	1.9
India	0.8	0.9
Southeast Asia & Pacific Islands	5.2	3.1
China	2.6	2.0
East Asia	1.5	12.6
Japan	0.1	8.2
Australia & New Zealand	6.2	0.4
World	100.0	100.0

The European Community (EC-12) is the largest exporter and importer of total agricultural products, counting intra-trade between the member countries. The United States is the largest net exporter of total agricultural products, not counting EC intra-trade.

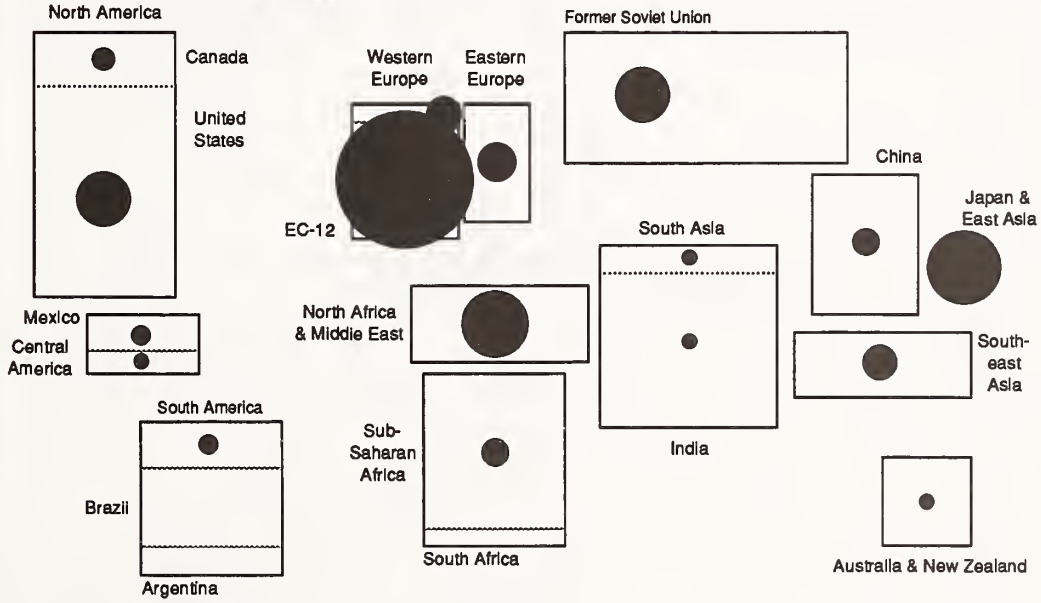


Lowest share in past 30 years occurred in 1986, before the export policies of the 1985 farm bill took effect.

WORLD EXPORTS OF TOTAL AGRICULTURAL PRODUCTS



WORLD IMPORTS OF TOTAL AGRICULTURAL PRODUCTS



Question. Which country has the largest export share of livestock and animal products, and which country is the largest importer?

WORLD TRADE IN LIVESTOCK AND ANIMAL PRODUCTS

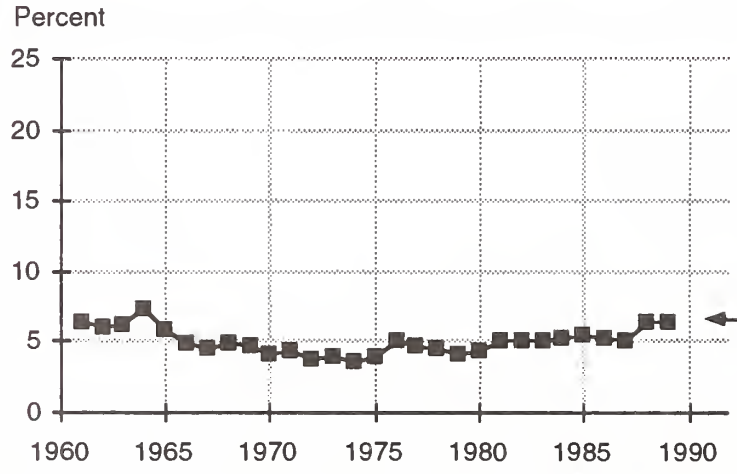
Percent of exports/imports, 1988 (Data displayed on map at right)

Region	Exports	Imports
North America	9.0	7.8
United States	6.4	6.6
Canada	2.6	1.2
Central America & Caribbean	0.7	2.8
Central America	0.7	1.6
Mexico	0.4	1.4
Caribbean	0.1	1.2
South America	3.6	1.1
Brazil	1.9	0.2
Argentina	1.2	0.0
Western Europe	66.0	57.1
EC-12	63.8	55.1
Eastern Europe	5.3	1.2
Former Soviet Union	0.2	3.1
Sub-Saharan Africa	0.9	2.4
South Africa	0.0	0.4
North Africa & Middle East	1.2	9.9
South Asia	0.2	0.5
India	0.2	0.1
Southeast Asia & Pacific Islands	1.0	2.6
China	1.7	0.2
East Asia	1.6	10.9
Japan	0.0	8.4
Australia & New Zealand	8.6	0.4
World	100.0	100.0

Largest exporters, not including the EC-12, are Australia/New Zealand and the United States.

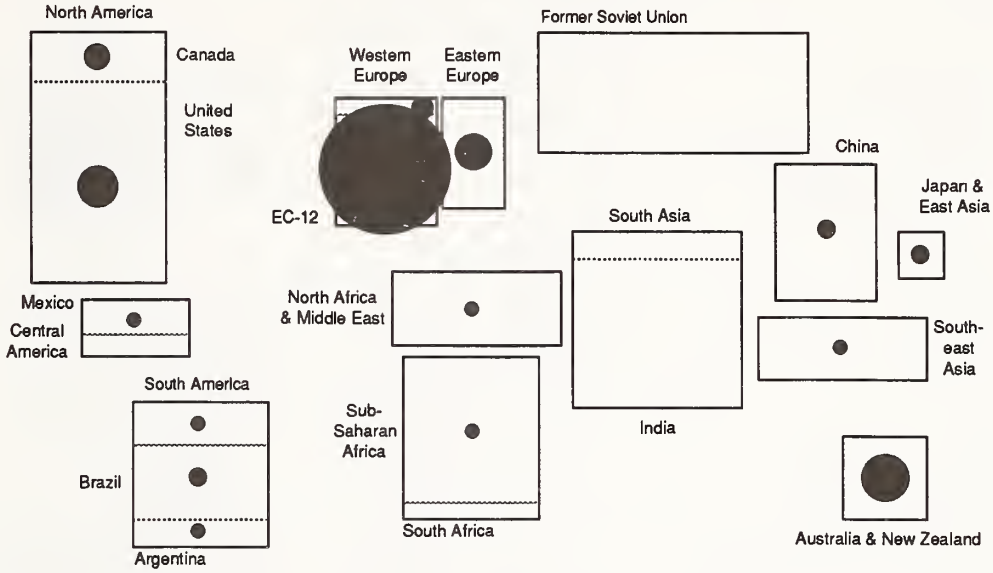
Largest importers, not including the EC-12, are the oil-rich countries of North Africa and the Middle East, and the newly industrializing countries of East Asia plus Japan.

U.S. SHARE OF WORLD LIVESTOCK EXPORTS

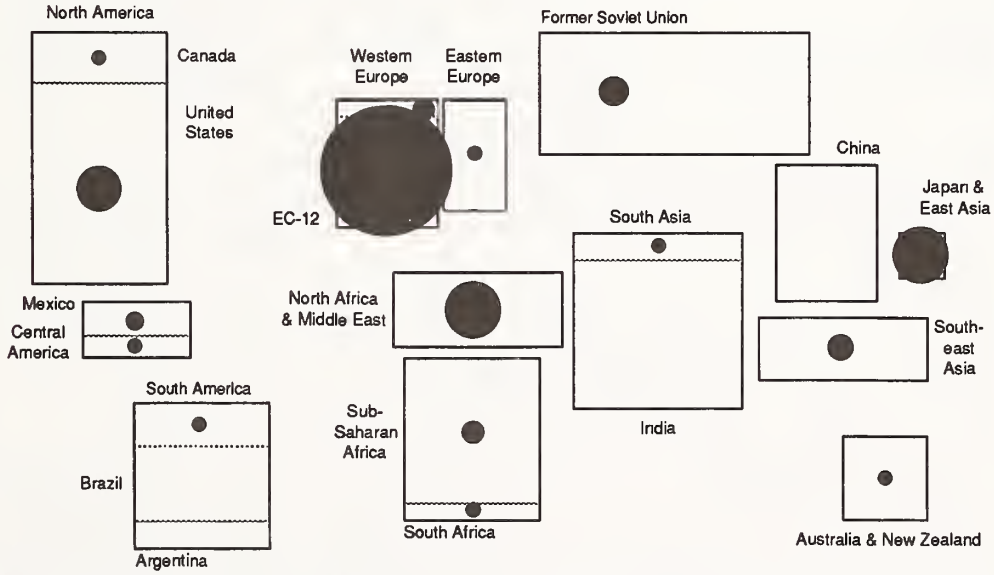


Slight gain in past 2 years, as beef exports to Japan increased from new trade policy agreement between the United States and Japan.

WORLD EXPORTS OF LIVESTOCK AND ANIMAL PRODUCTS



WORLD IMPORTS OF LIVESTOCK AND ANIMAL PRODUCTS



Question. Which country has the largest export share of feedstuffs (including corn, oilseeds, and meal), and which country is the largest importer?

WORLD TRADE IN FEEDSTUFFS

"Feedstuffs" includes coarse grains, oilseeds, and oilseed meals;
Percent of exports/imports, 1988 (Data displayed on map at right)

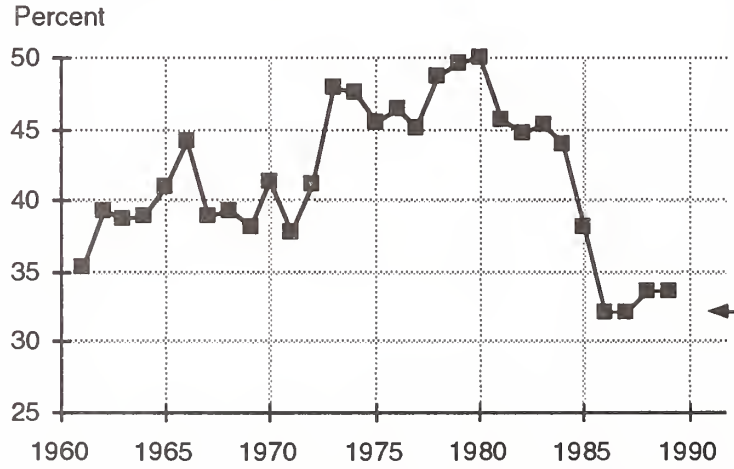
Region	Exports	Imports
North America	45.6	1.8
United States	41.7	0.9
Canada	3.9	0.9
Central America & Caribbean	0.2	4.7
Central America	0.1	3.8
Mexico	0.1	3.4
Caribbean	0.0	0.9
South America	18.1	2.6
Brazil	9.1	0.3
Argentina	8.3	0.0
Western Europe	24.4	43.0
EC-12	23.9	41.1
Eastern Europe	1.3	5.8
Former Soviet Union	0.2	8.1
Sub-Saharan Africa	1.1	0.7
South Africa	0.3	0.0
North Africa & Middle East	0.4	8.4
South Asia	0.6	0.4
India	0.5	0.2
Southeast Asia & Pacific Islands	1.8	2.5
China	5.5	0.2
East Asia	0.1	21.8
Japan	0.1	15.0
Australia & New Zealand	0.7	0.1
World	100.0	100.0

Largest exporters, not including the EC-12, are the United States, Brazil, and Argentina.

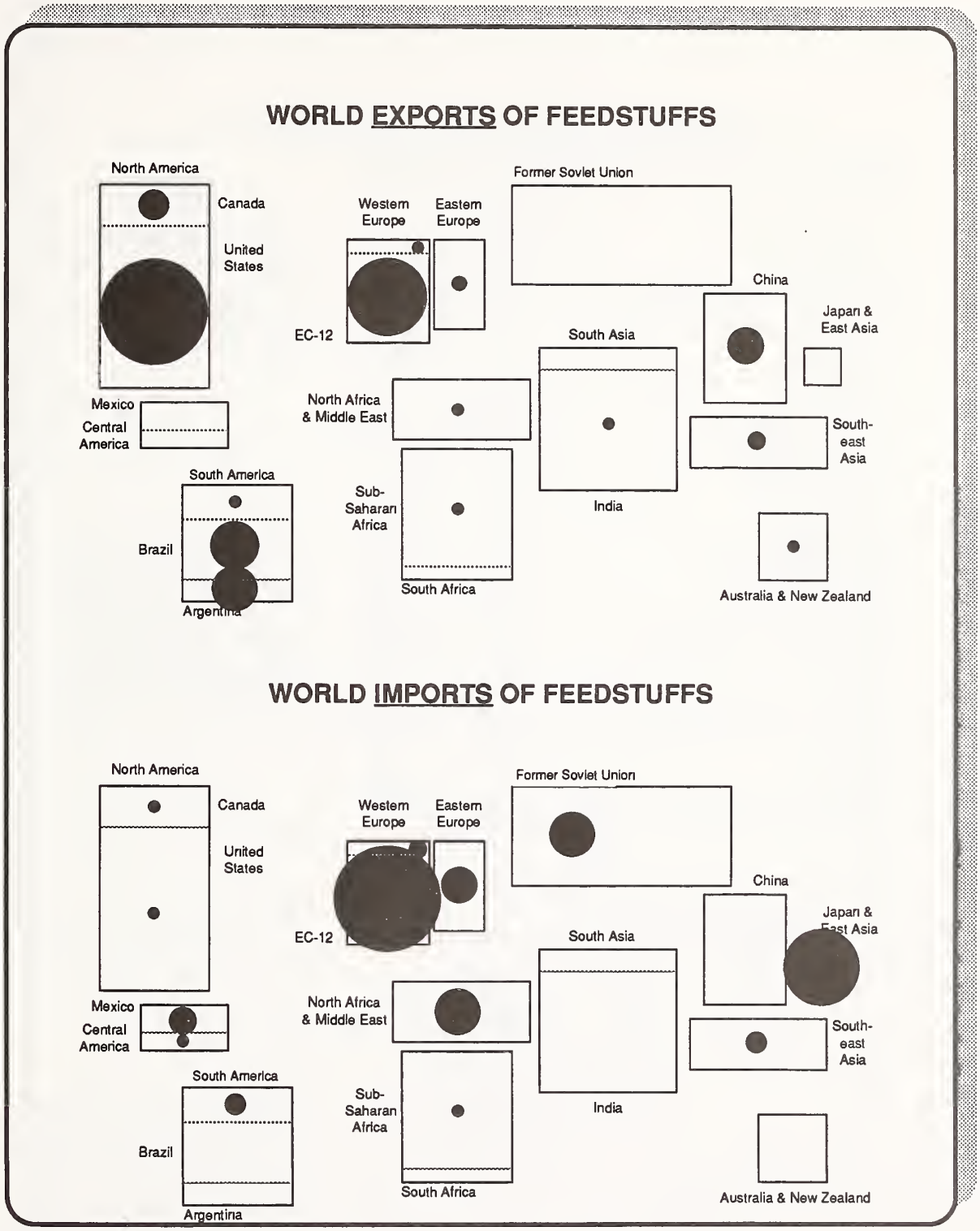
The EC-12 is also a large exporter of feedstuffs, but imports more than it exports.

Largest importers, not including the EC-12, are the oil-rich countries of North Africa and the Middle East, the former Soviet Union, and the newly industrializing countries of East Asia plus Japan.

U.S. SHARE OF WORLD FEEDSTUFFS EXPORTS



U.S. share declined in the 1980's as subsidized feedgrain exports from the EC-12 rose strongly.



Question. Which country has the largest export share of wheat and rice, and which country is the largest importer?

WORLD TRADE IN WHEAT AND RICE

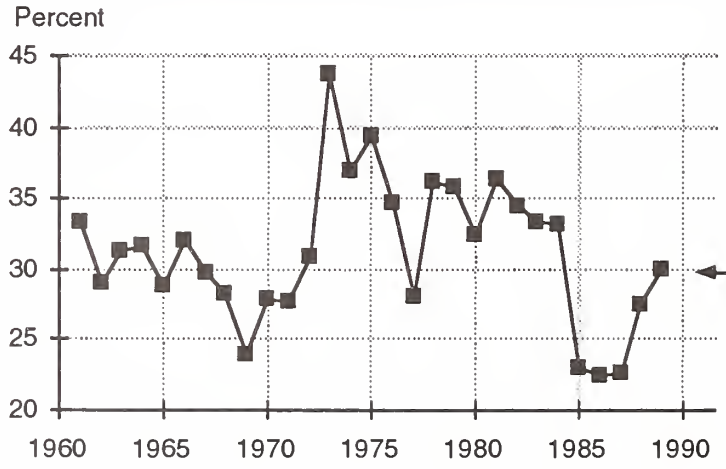
Percent of exports/imports, 1988 (Data displayed on map at right)

Region	Exports	Imports
North America	46.3	0.9
United States	28.6	0.6
Canada	17.7	0.3
Central America & Caribbean	0.2	3.2
Central America	0.1	1.3
Mexico	0.1	0.6
Caribbean	0.1	1.9
South America	2.5	3.3
Brazil	0.0	0.7
Argentina	1.8	0.0
Western Europe	27.7	20.5
EC-12	27.1	19.6
Eastern Europe	1.9	2.3
Former Soviet Union	1.1	11.5
Sub-Saharan Africa	0.3	6.8
South Africa	0.2	0.3
North Africa & Middle East	2.4	24.3
South Asia	2.2	5.0
India	0.5	2.0
Southeast Asia & Pacific Islands	7.0	4.9
China	0.8	8.2
East Asia	0.9	9.0
Japan	0.3	4.6
Australia & New Zealand	6.7	0.2
World	100.0	100.0

Largest exporters, not including the EC-12, are the United States, Canada, Thailand, and Australia.

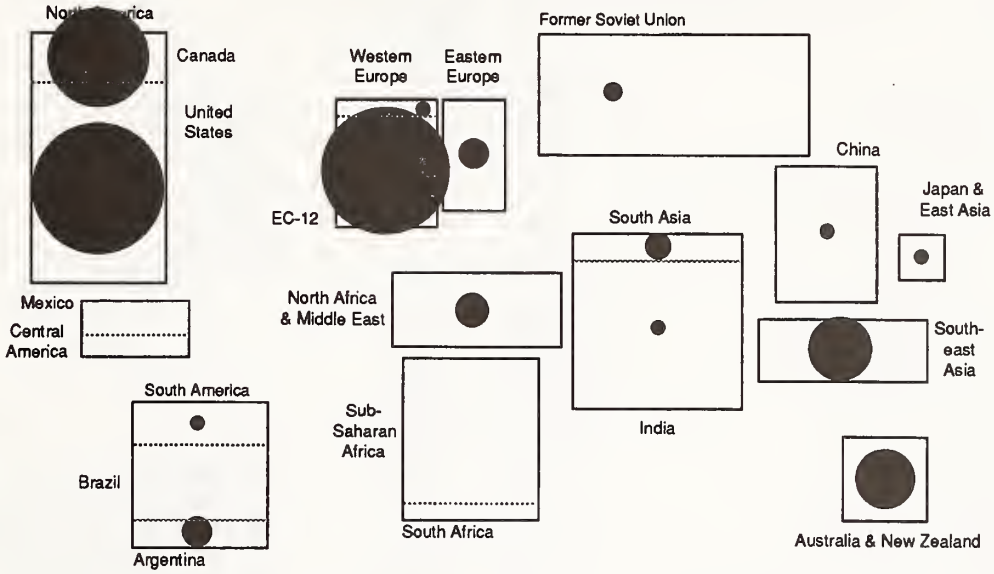
Largest importers, not including the EC-12, are the former Soviet Union, Africa, the Middle East, China, and the newly industrializing countries of East Asia plus Japan.

U.S. SHARE OF WORLD WHEAT & RICE EXPORTS

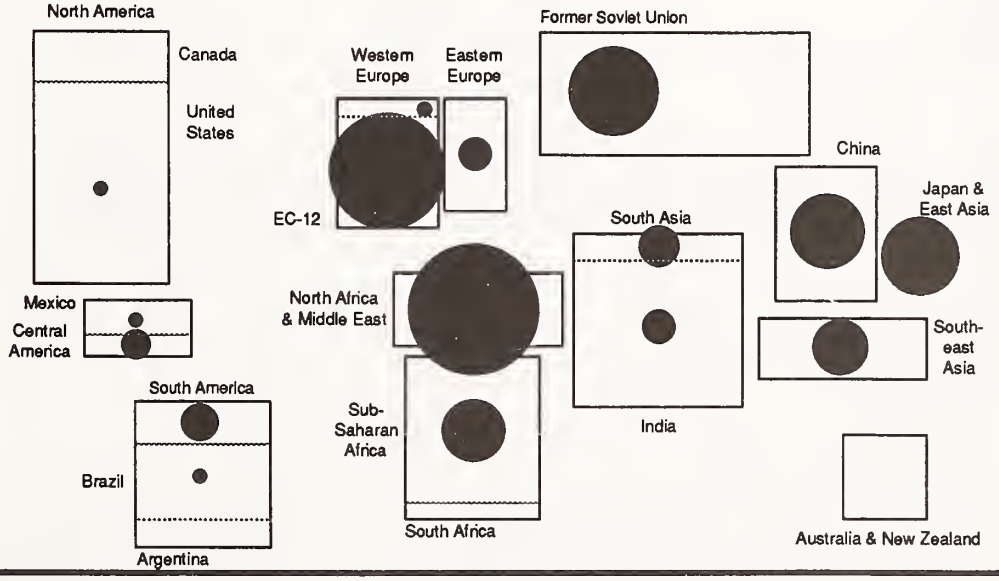


U.S. share in the late 1980's benefited from lower loan rates and Export Enhancement programs of the 1985 farm bill.

WORLD EXPORTS OF WHEAT AND RICE



WORLD IMPORTS OF WHEAT AND RICE



Question. Which country has the largest export share of vegetable oils, and which country is the largest importer?

WORLD TRADE IN VEGETABLE OILS

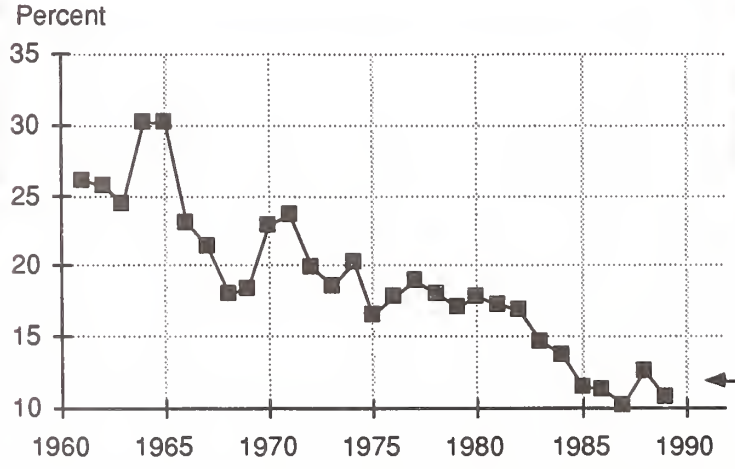
Percent of exports/imports, 1988 (Data displayed on map at right)

Region	Exports	Imports
North America	11.1	9.1
United States	9.3	8.3
Canada	1.8	0.7
Central America & Caribbean	0.2	3.2
Central America	0.2	1.7
Mexico	0.0	1.4
Caribbean	0.1	1.5
South America	14.0	2.4
Brazil	4.3	0.4
Argentina	9.6	0.0
Western Europe	29.7	29.0
EC-12	28.8	27.1
Eastern Europe	1.7	1.9
Former Soviet Union	0.9	2.9
Sub-Saharan Africa	2.1	4.4
South Africa	0.2	1.0
North Africa & Middle East	1.9	16.5
South Asia	0.5	14.6
India	0.4	8.3
Southeast Asia & Pacific Islands	36.5	7.1
China	0.8	3.5
East Asia	0.6	4.5
Japan	0.2	2.4
Australia & New Zealand	0.1	0.8
World	100.0	100.0

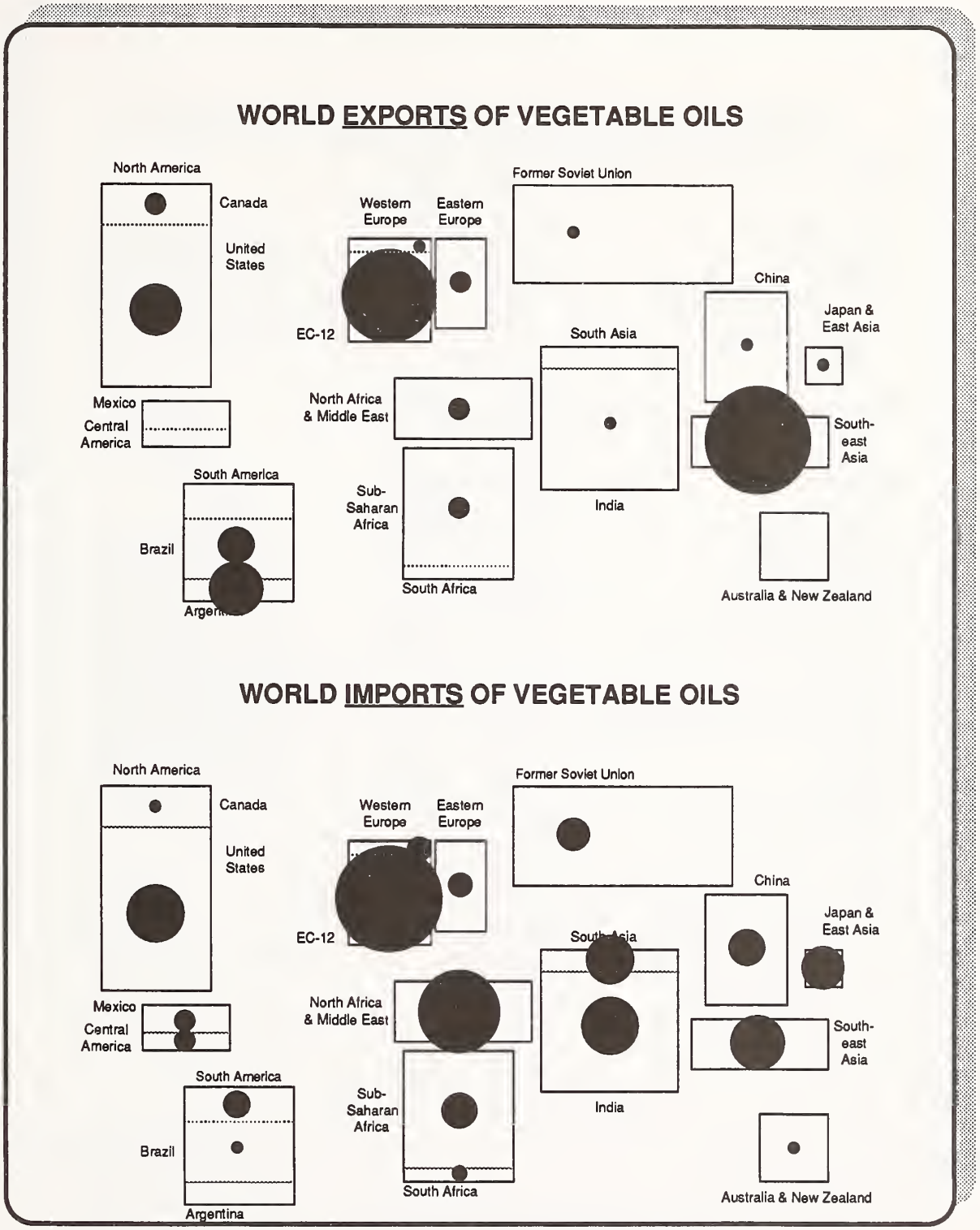
Largest exporters, not including the EC-12, are the United States, Brazil, Argentina, and Southeast Asia (especially palm oil).

Largest importers, not including the EC-12, are the United States, North Africa, the Middle East, and South and Southeast Asia.

U.S. SHARE OF WORLD VEGETABLE OILS EXPORTS



U.S. share continued to decline as vegetable oils other than soybean — especially palm oil— became more competitive.



Question. Which country has the largest export share of fruit, sugar, and other foods, and which country is the largest importer?

WORLD TRADE IN FRUIT, SUGAR, AND OTHER FOODS

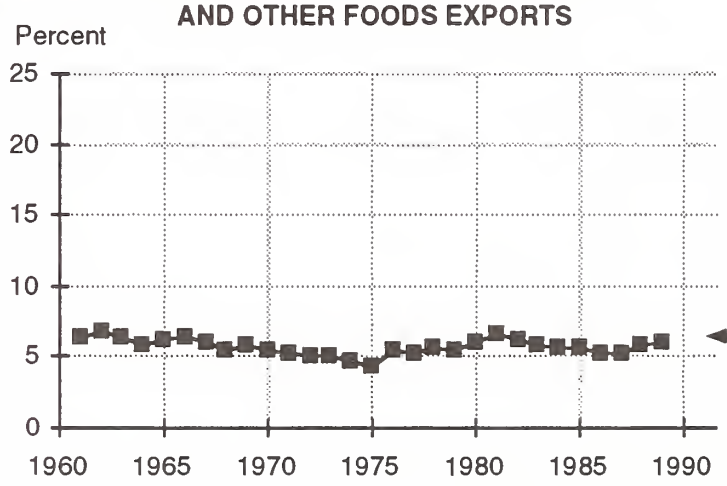
Percent of exports/imports, 1988 (Data displayed on map at right)

Region	Exports	Imports
North America	6.1	16.6
United States	5.3	13.4
Canada	0.8	3.2
Central America & Caribbean	15.1	0.6
Central America	6.3	0.1
Mexico	2.4	0.1
Caribbean	8.8	0.5
South America	13.4	0.9
Brazil	6.8	0.2
Argentina	0.7	0.1
Western Europe	33.4	49.4
EC-12	32.9	43.5
Eastern Europe	2.3	3.9
Former Soviet Union	0.4	9.5
Sub-Saharan Africa	9.8	1.2
South Africa	1.1	0.1
North Africa & Middle East	5.0	6.4
South Asia	2.6	1.1
India	1.8	0.5
Southeast Asia & Pacific Islands	7.1	1.8
China	1.9	1.3
East Asia	1.1	6.7
Japan	0.1	4.7
Australia & New Zealand	1.8	0.6
World	100.0	100.0

Largest exporters, not including the EC-12, are Central America, South America, Africa, and Southeast Asia.

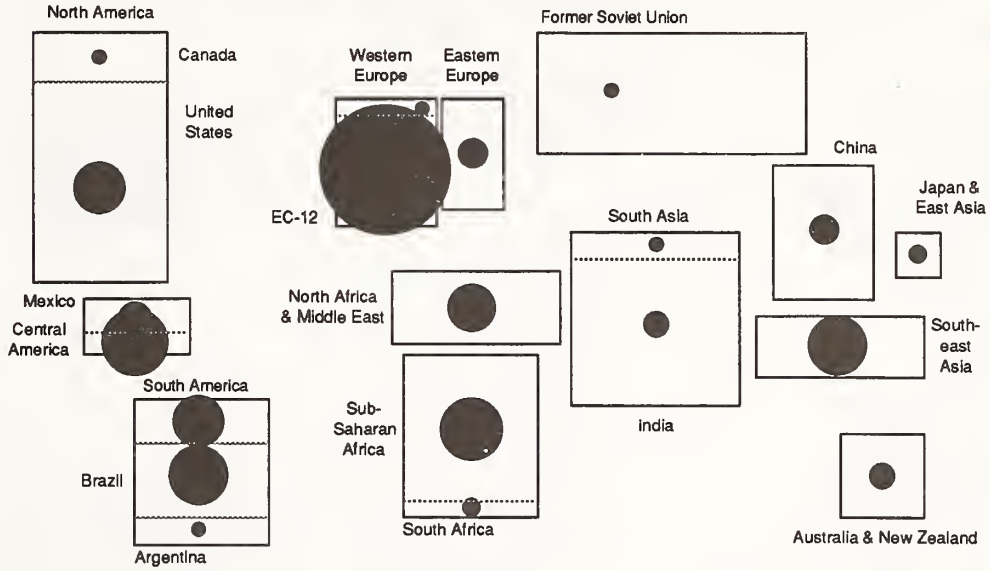
Largest importers, not including the EC-12, are the United States, the former Soviet Union, the oil-rich countries of North Africa and the Middle East, and the newly industrializing countries of East Asia plus Japan.

U.S. SHARE OF WORLD FRUIT, SUGAR, AND OTHER FOODS EXPORTS

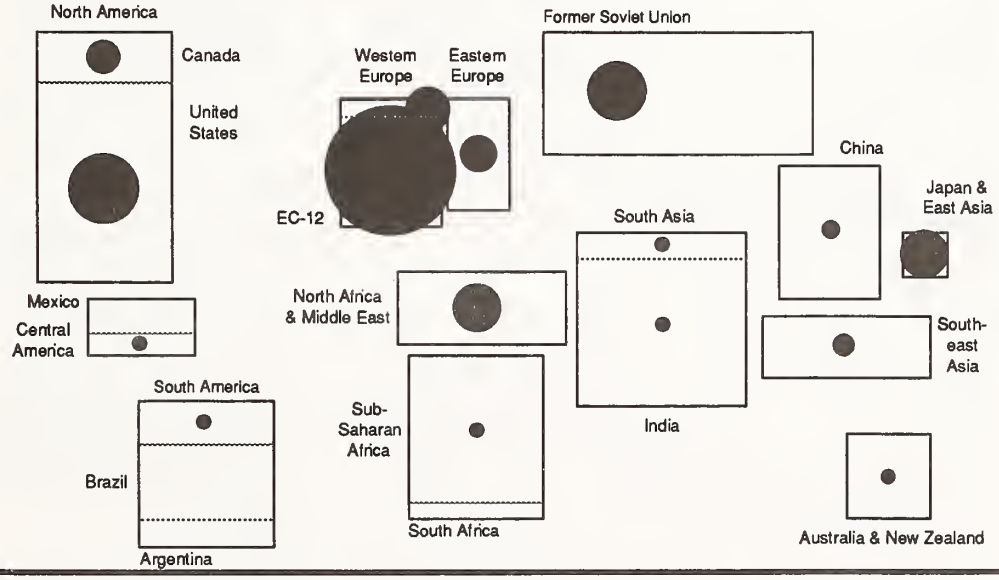


Slight gain as citrus exports to Japan increased , due to new trade policy agreement between the United States and Japan.

WORLD EXPORTS OF FRUIT, SUGAR, AND OTHER FOODS



WORLD IMPORTS OF FRUIT, SUGAR, AND OTHER FOODS



Question. Which country has the largest export share of fibers and tobacco, and which country is the largest importer?

WORLD TRADE IN FIBERS AND TOBACCO

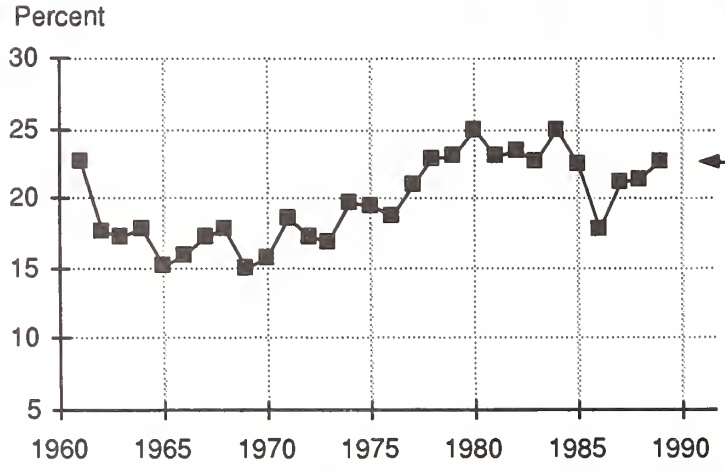
Percent of exports/imports, 1988 (Data displayed on map at right)

Region	Exports	Imports
North America	22.8	3.5
United States	22.5	3.2
Canada	0.3	0.3
Central America & Caribbean	1.5	0.6
Central America	1.0	0.2
Mexico	0.6	0.2
Caribbean	0.5	0.4
South America	5.4	1.2
Brazil	2.3	0.6
Argentina	1.3	0.0
Western Europe	18.6	35.9
EC-12	17.4	33.5
Eastern Europe	3.5	7.3
Former Soviet Union	5.5	6.9
Sub-Saharan Africa	7.0	1.5
South Africa	0.1	0.4
North Africa & Middle East	3.7	6.3
South Asia	3.1	1.4
India	0.4	0.8
Southeast Asia & Pacific Islands	1.1	5.0
China	4.6	4.4
East Asia	4.5	25.4
Japan	0.3	13.4
Australia & New Zealand	18.7	0.5
World	100.0	100.0

Largest exporters, not including the EC-12, are Australia/New Zealand and the United States.

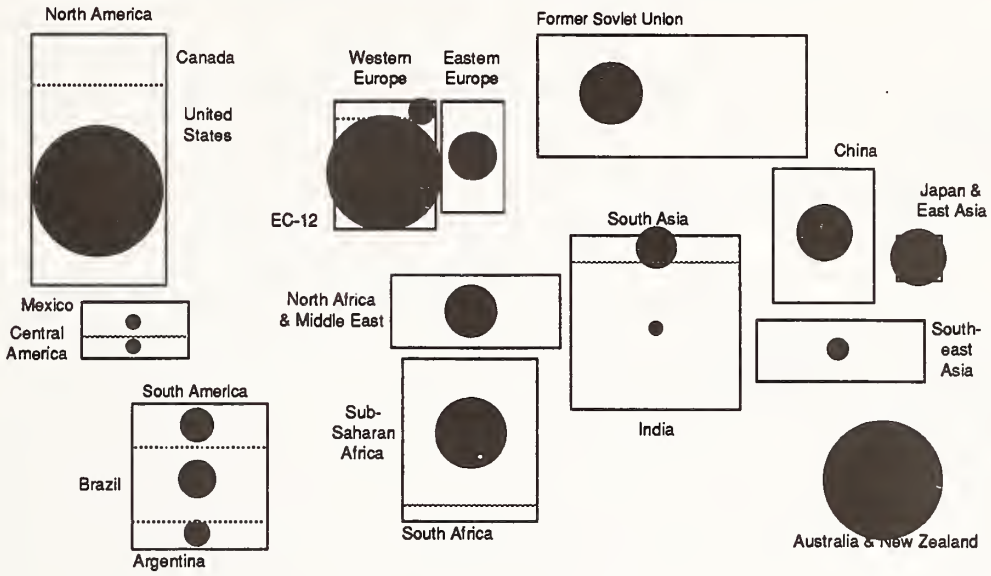
Largest importers, not including the EC-12, are Eastern Europe, the former Soviet Union, the oil-rich countries of North Africa and the Middle East, and the newly industrializing countries of East Asia plus Japan.

U.S. SHARE OF WORLD FIBER & TOBACCO EXPORTS

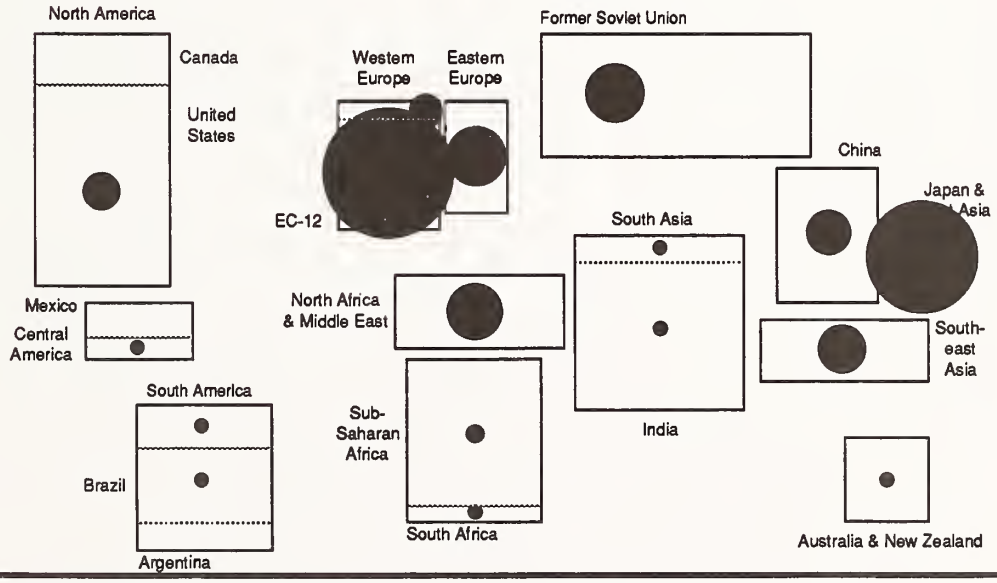


Recovery after 1986 due to policy changes in the 1985 farm bill.

WORLD EXPORTS OF FIBERS AND TOBACCO



WORLD IMPORTS OF FIBERS AND TOBACCO

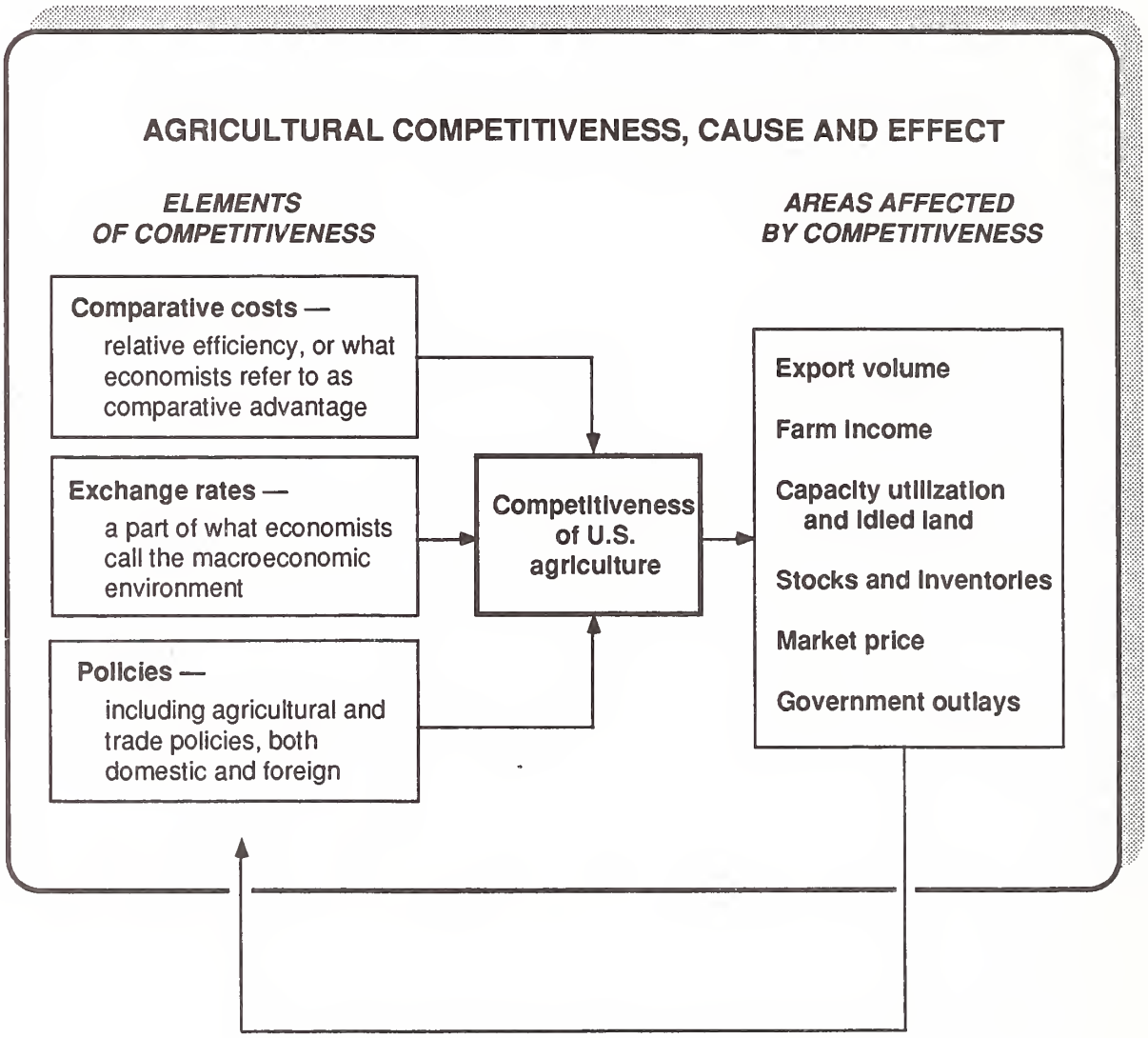


In the next part, we will trace the patterns of world agricultural trade in more detail through history, focusing on changes in competitiveness brought about by changes in relative costs, exchange rates, and policies.

The Basic
Elements of
Agricultural
Competitiveness

PART THREE. HISTORY

As discussed in Part One, the three main elements of agricultural competitiveness are comparative costs, exchange rates, and policies. And as shown in Part Two, these elements are intimately affected by geography. Now in Part Three, we come to changes in competitiveness over time. History shows how cause and effect continually loop back on themselves, creating further changes.



"Feedback Loop" in which countries change their relative efficiency and macroeconomic and agricultural policies in order to achieve a desired outcome over time.

Question. What are the consequences on the areas listed above (export volume, farm income, etc.) of rising competitiveness? What are the consequences of declining competitiveness?

Rising competitiveness increases export volume, which in turn helps to raise farm income, increase capacity utilization, reduce idled land, reduce stocks, increase market price, and decrease government outlays on farm support. The opposite chain of events occurs when competitiveness declines.

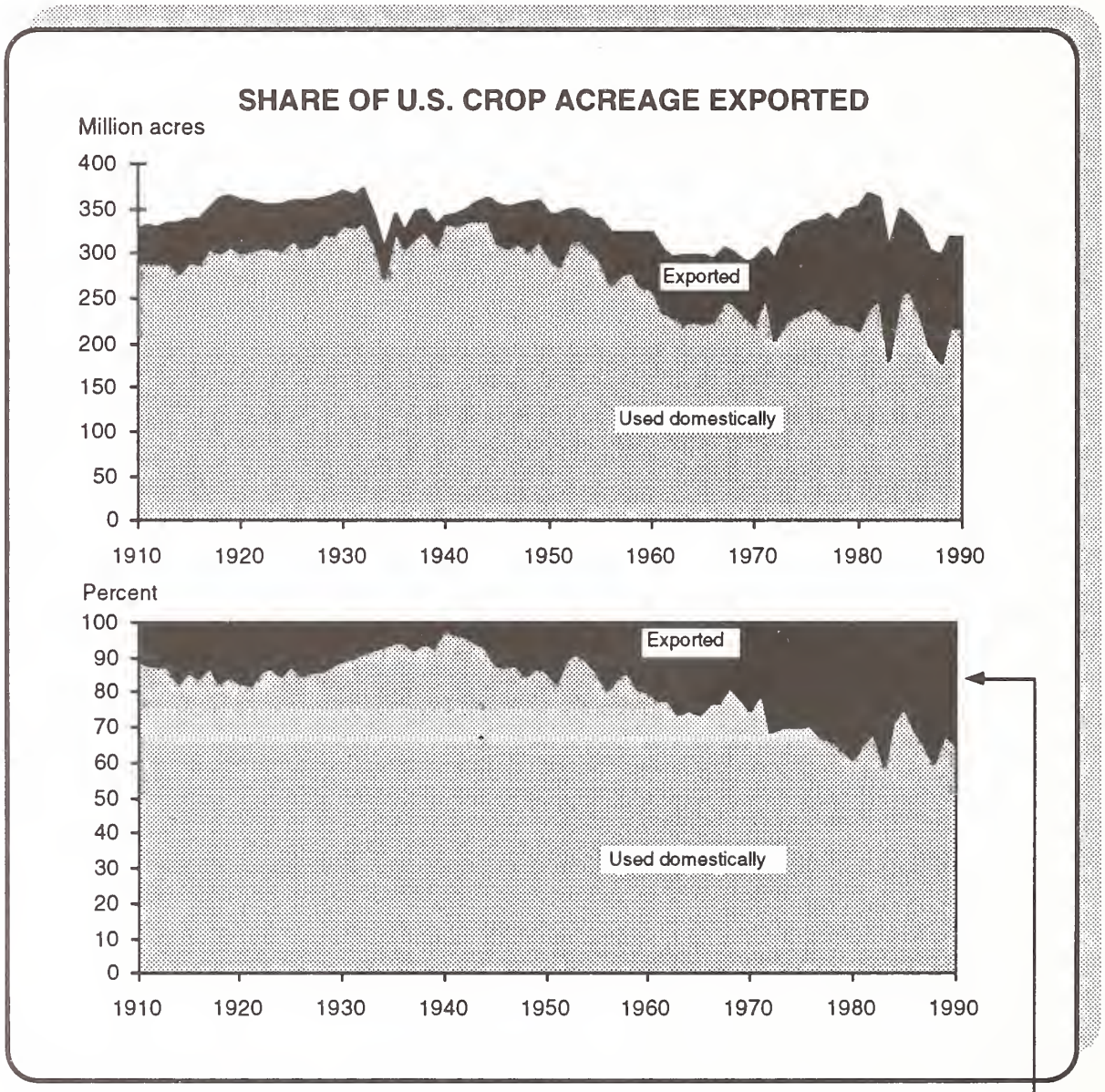
CONSEQUENCES OF CHANGES IN AGRICULTURAL COMPETITIVENESS

	Direction of change in competitiveness	
Area affected	Rising	Declining
Export volume	up	down
Farm income	up	down
Capacity utilization	up	down
Idled land	down	up
Stocks and inventories	down	up
Market price	up	down
Government outlays (under current policies)	down	up

The above pattern of consequences is generalized. In specific cases, the pattern is mixed and complicated because of the feedback of consequences on causes. Competitors are constantly reacting to the effects that their actions and reactions have caused, and thus altering their actions afresh.

Question. What portion of U.S. agricultural production is exported, and how does this affect the competitiveness of U.S. agriculture?

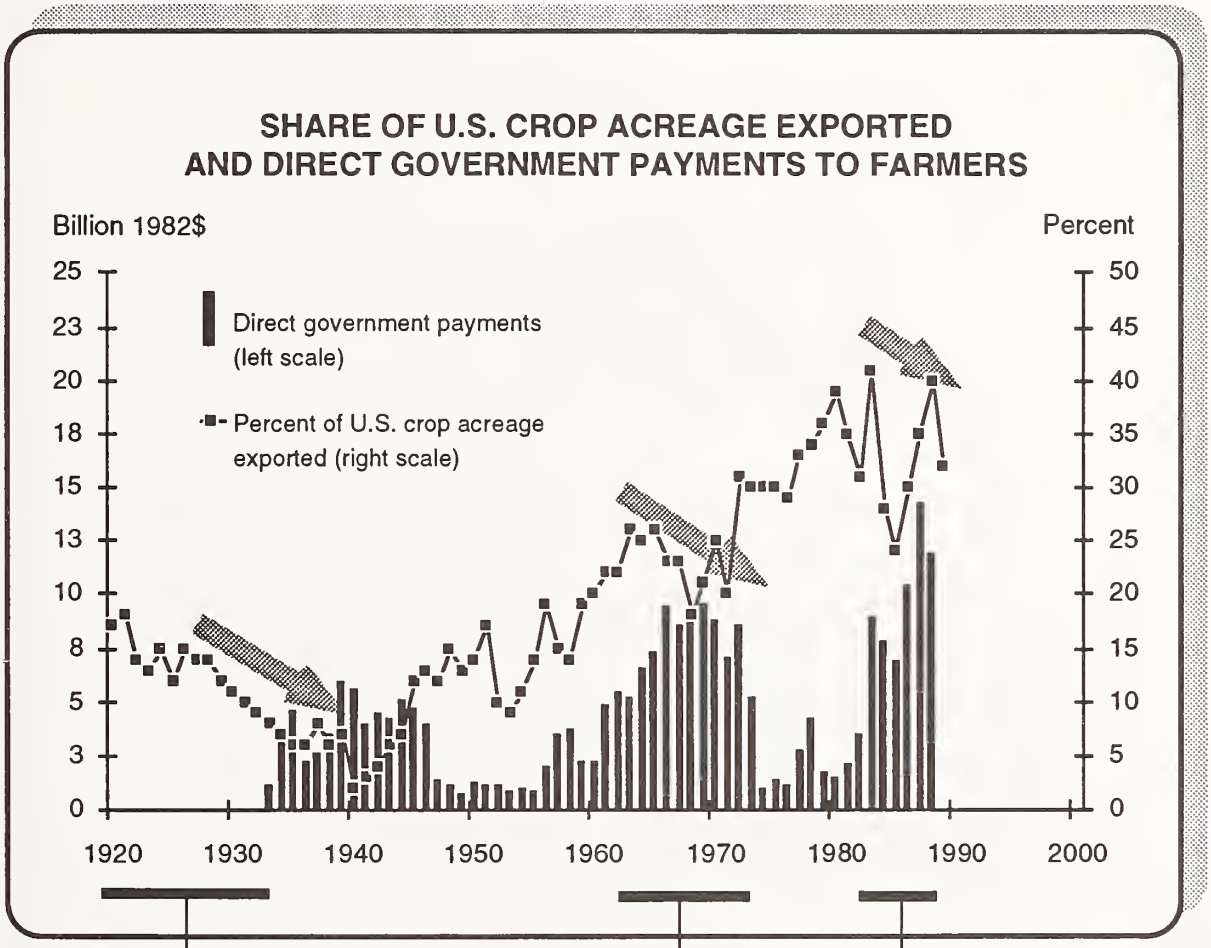
Since World War II, the share of U.S. crop production exported, in terms of the acreage required for that production, has grown from 10 percent to over 35 percent.



Because the domestic market absorbs a smaller and smaller share of production, U.S. agriculture must compete more and more effectively with other countries for share of world market — or else accept a reduction of productive capacity.

Question. How have changes in export volume affected U.S. Government farm policy and expenditure?

In periods of declining exports, U.S. Government policy has led to increased direct payments to U.S. farmers.

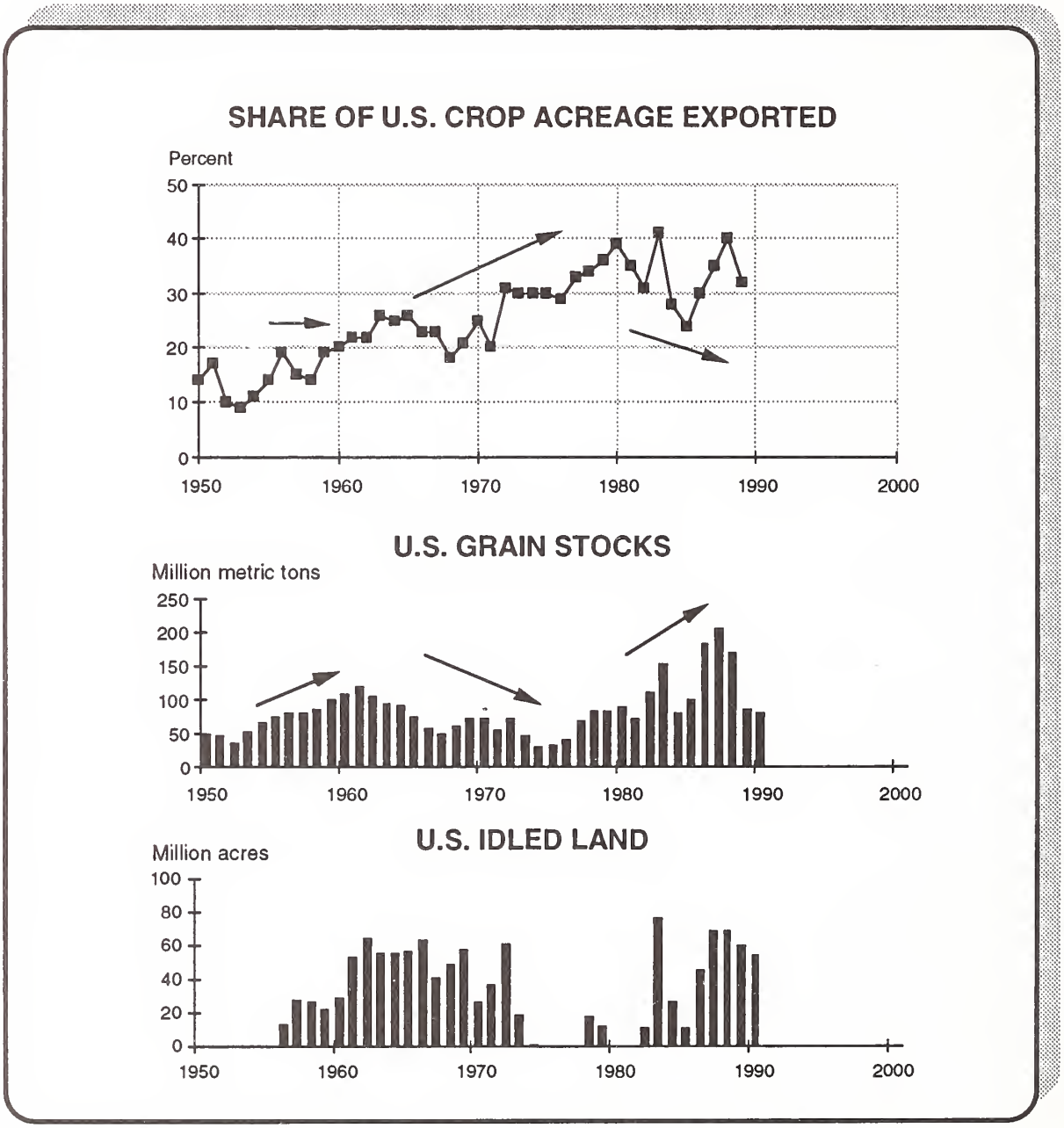


The decline in exports during the 1920's and 1930's led to farm price supports and direct government payments to farmers.

These payments increase when market prices are weak (which are usually when exports are weak — see above three arrows), and they decline when market prices are strong (which is usually when exports are strong).

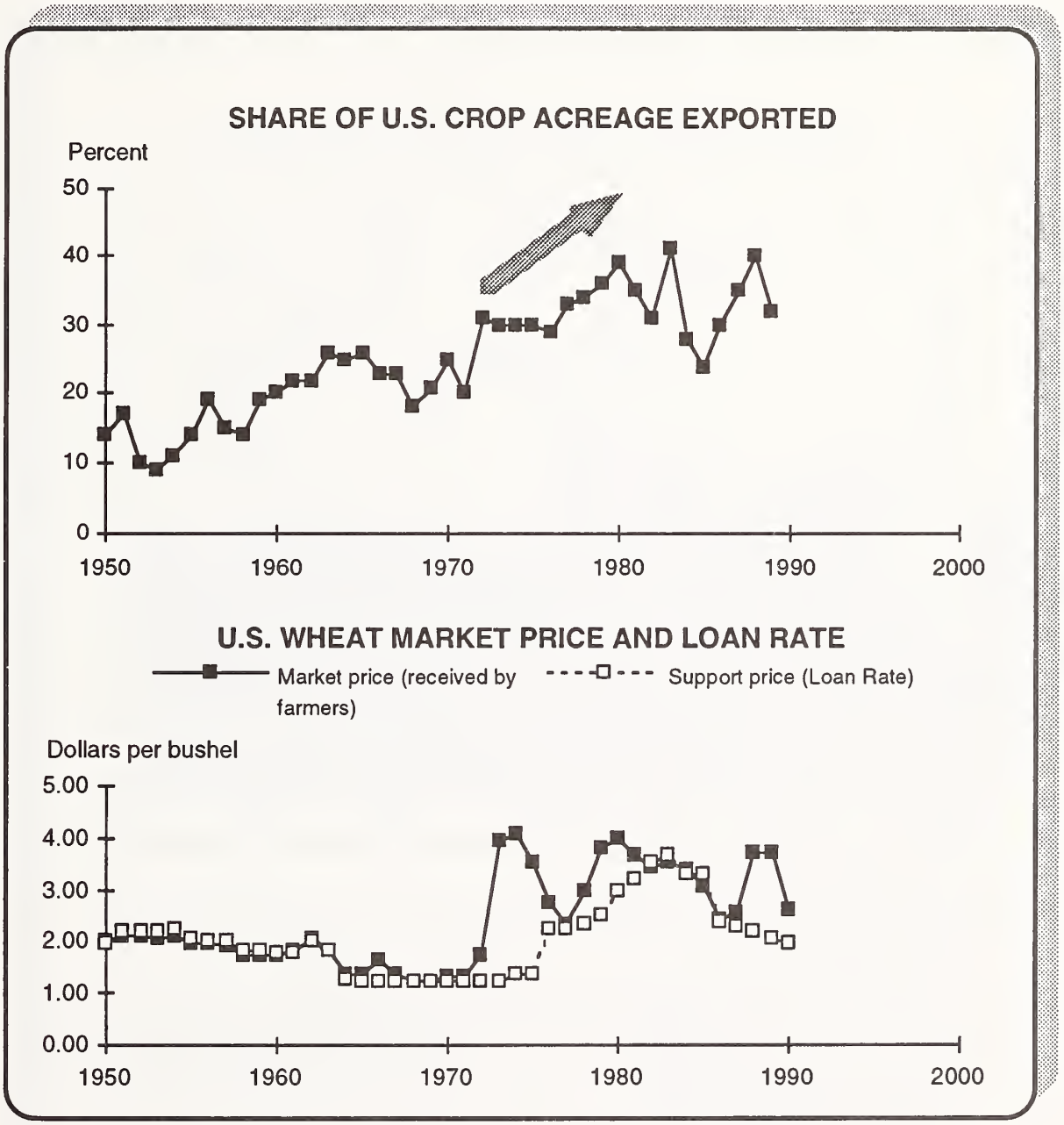
Question. What other aspects of farm policy move pretty much in step with exports?

Over time, when export share is flat or declining (see arrows below), grain stocks tend to build, followed by the idling of cropland until stocks recede and prices rise, or until growth of exports uses excess stocks, and prices rise.



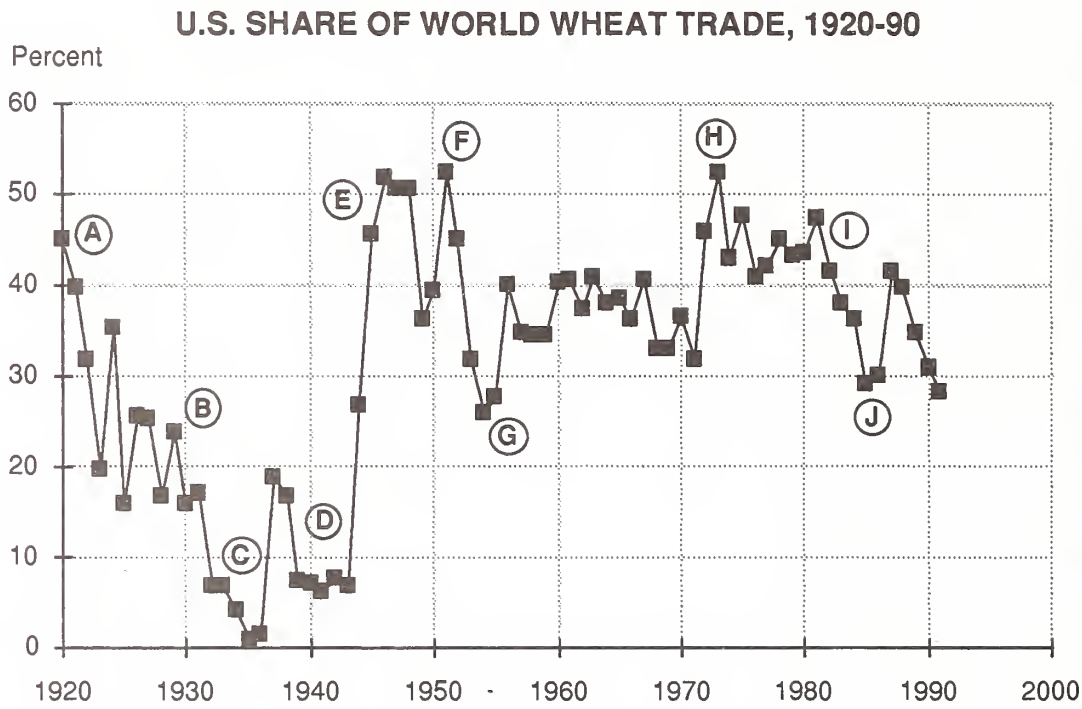
Question. What can happen to farm policy in periods when export volume is increasing?

During the U.S. export boom of the 1970's (see top arrow below), market prices rose, followed by rises in government support prices. When export demand later declined in the early 1980's, the support prices did not automatically fall, which put U.S. production at a competitive disadvantage to many other countries.



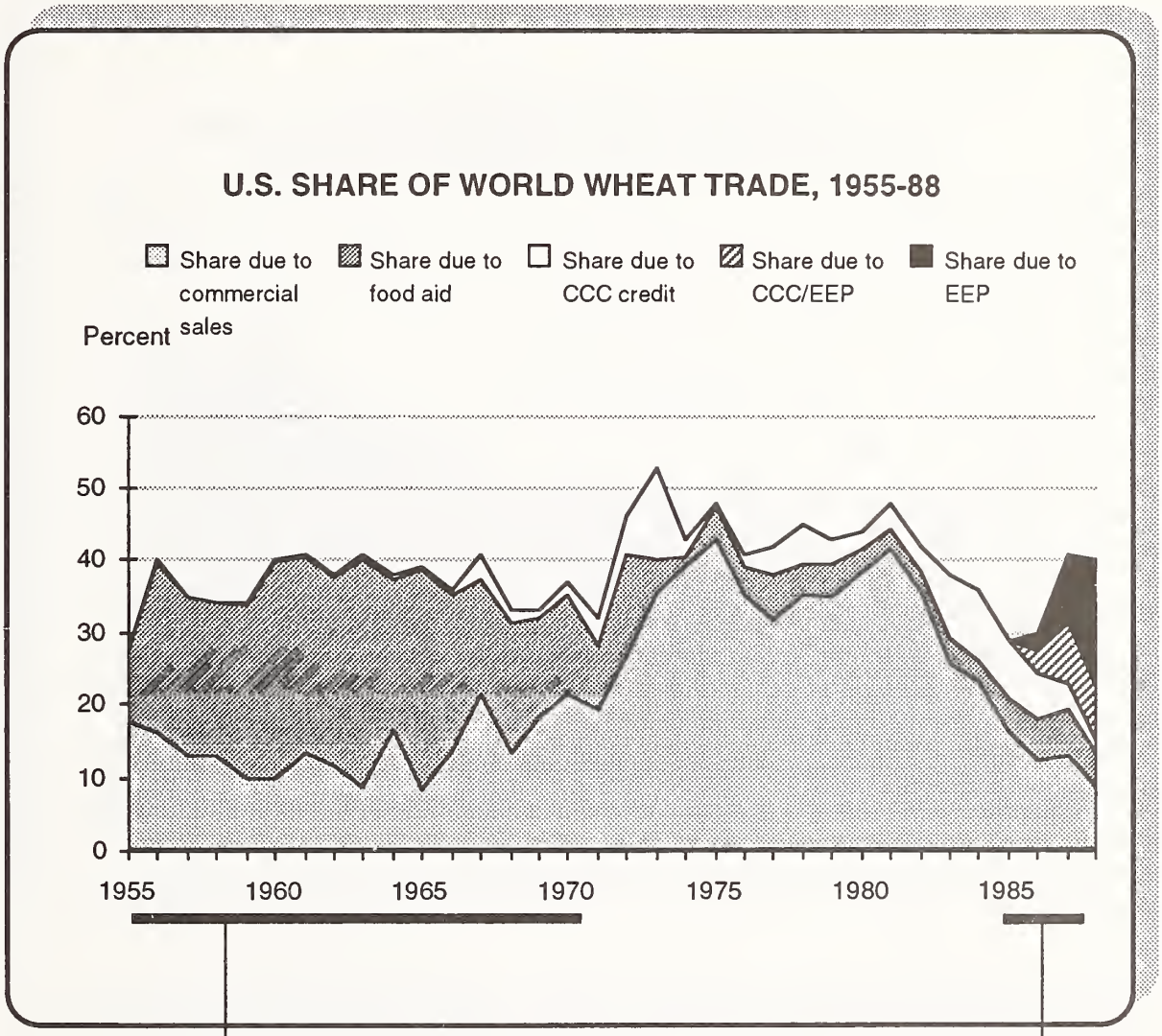
Question. Over the very long term, how have changes in world politics and economics affected U.S. agricultural competitiveness?

In the case of wheat, shown below, the U.S. share of world wheat trade has swung from highs of above 50 percent to lows of 30 percent or less (as in the 1930's), depending on political, economic, and climatic events.



A. *Recovery from World War I. United States has high share for several years.*
B. *At start of Great Depression, U.S. share collapses as most countries (including the United States) invoke restrictive tariffs.*
C. *Several years of very bad weather (Dustbowl era) cause decline in U.S. production.*
D. *World War II restricts trade.*
E. *Recovery from World War II leads to boom.*
F. *Peak of Marshall Plan aid, soon followed by recovery of European crop production and by surpluses in U.S.*
G. *Food for Peace (PL480) launched to help absorb U.S. surpluses.*
H. *Soviet Union changes policy to import more grain, enabled in part by rising price of oil.*
I. *Boom of 1970's ends as many importing countries cannot pay debt they have incurred to buy oil and food.*
J. *U.S. 1985 farm bill has new provisions to enhance U.S. exports, but competition with EC-12 is very tough.*

During extended periods of weak U.S. export share, government policy is often changed or supplemented to boost shipments, in an attempt to relieve surpluses and raise farm income.

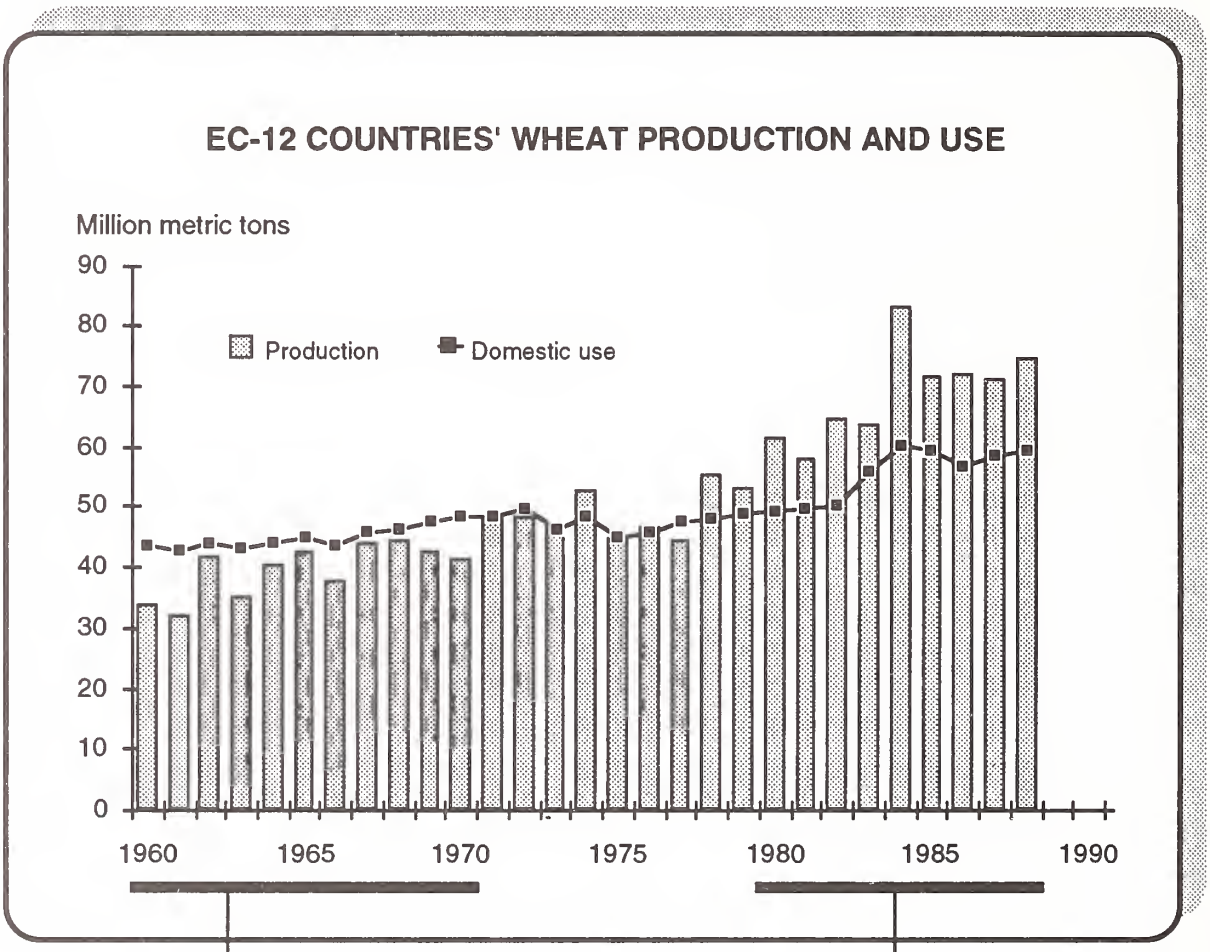


Between 1955 and 1970, food aid programs such as PL480 ("Food for Peace") accounted for the majority of U.S. wheat exports.

Since 1985, Export Enhancement (subsidies) and credit programs account for the majority of U.S. wheat exports.

Question. In the period shown above, what country or region has become the main competitor of the United States for wheat exports?

The main competitor for wheat trade has become the European Community (EC-12). During the period shown below, EC-12 production was stimulated by high internal prices put in place by government policy. By the late 1970's, EC-12 production exceeded domestic use, and the excess was shipped onto world markets by means of subsidies.

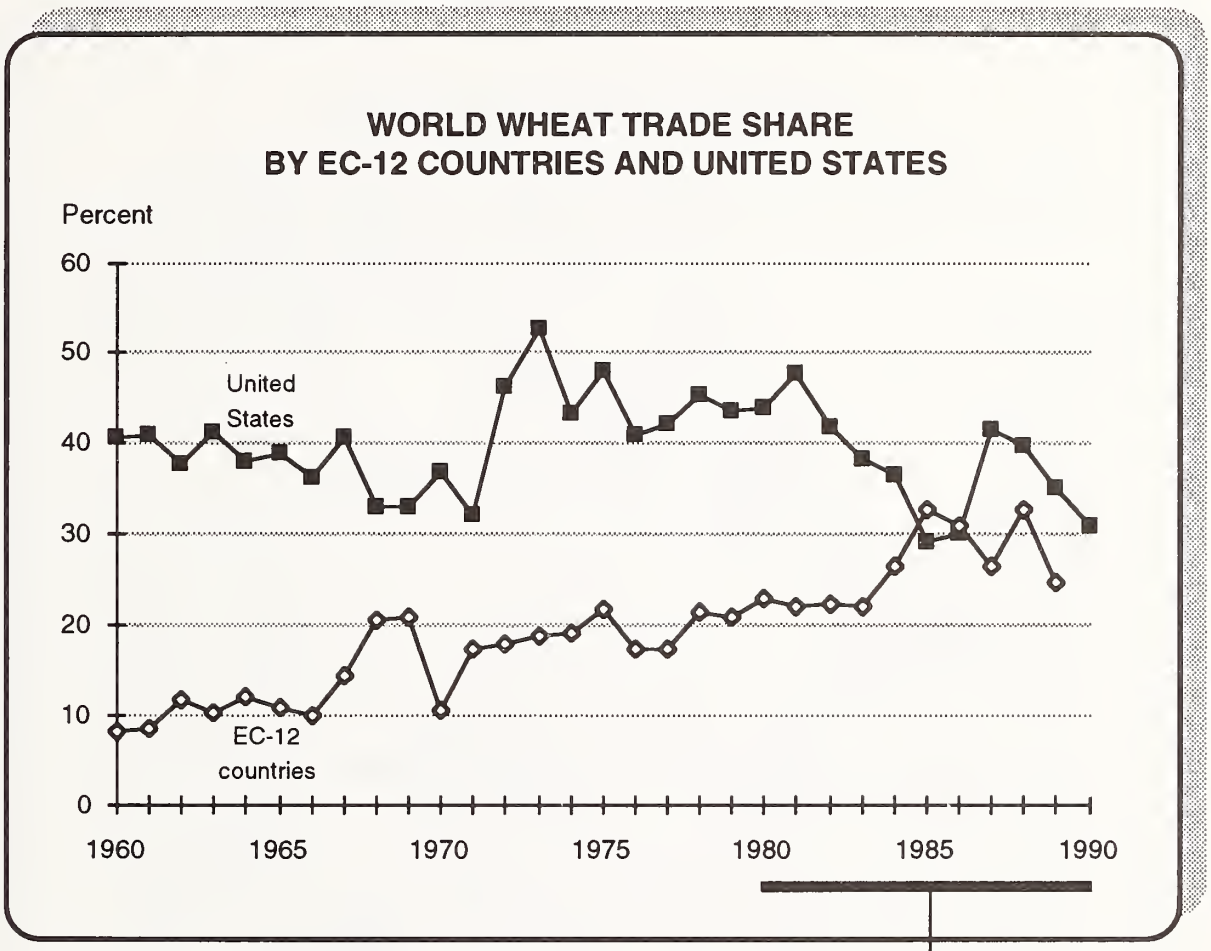


After WWII, the EC was a major <u>importer</u> of wheat.

In the 1980's, the EC became a major exporter of wheat, due to production in excess of use, plus the policy of subsidizing exports.

Question. What is the name for the EC-12 policy which led to the above switch?

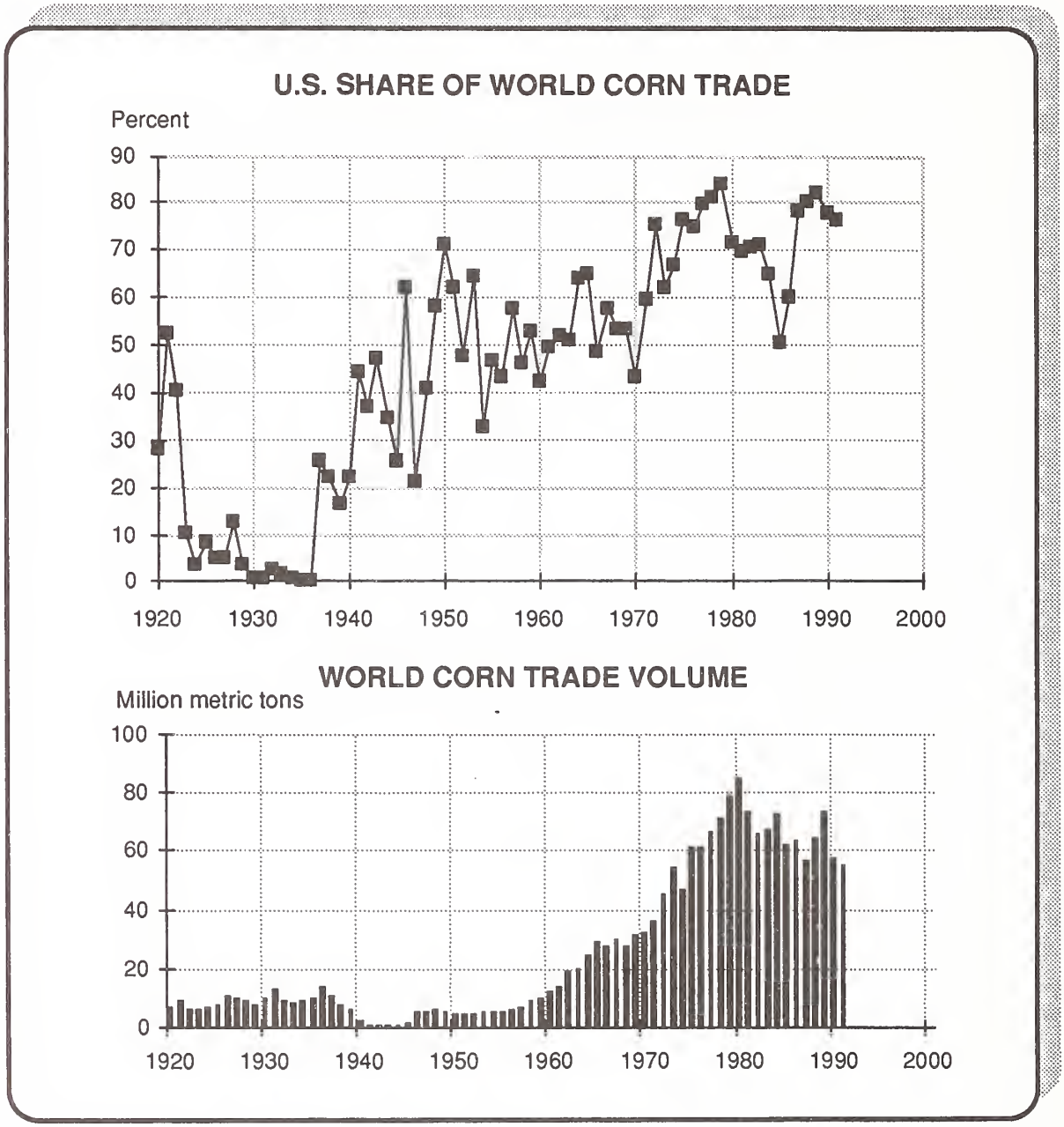
When the EC was formed in 1957, the Common Agricultural Policy (CAP) was a key element in the agreement. The CAP provided internal target prices for producers, as well as guaranteed minimum prices at which government authorities would intervene and buy the products for Community storage. The CAP also set import levies to raise the price of grain from the United States and other countries outside the EC.



In addition to high internal target prices and import levies, the CAP provided export "restitutions" (subsidies) for its own producers in times of surplus production.

Question. What about the competitiveness of other grains besides wheat? Does U.S. corn have the same share of world trade as wheat?

No, each agricultural product has its own pattern of competitiveness. U.S. corn, for instance, has maintained a fairly high share of world trade, even through most of the 1980's. But overall volume of world corn trade has declined.

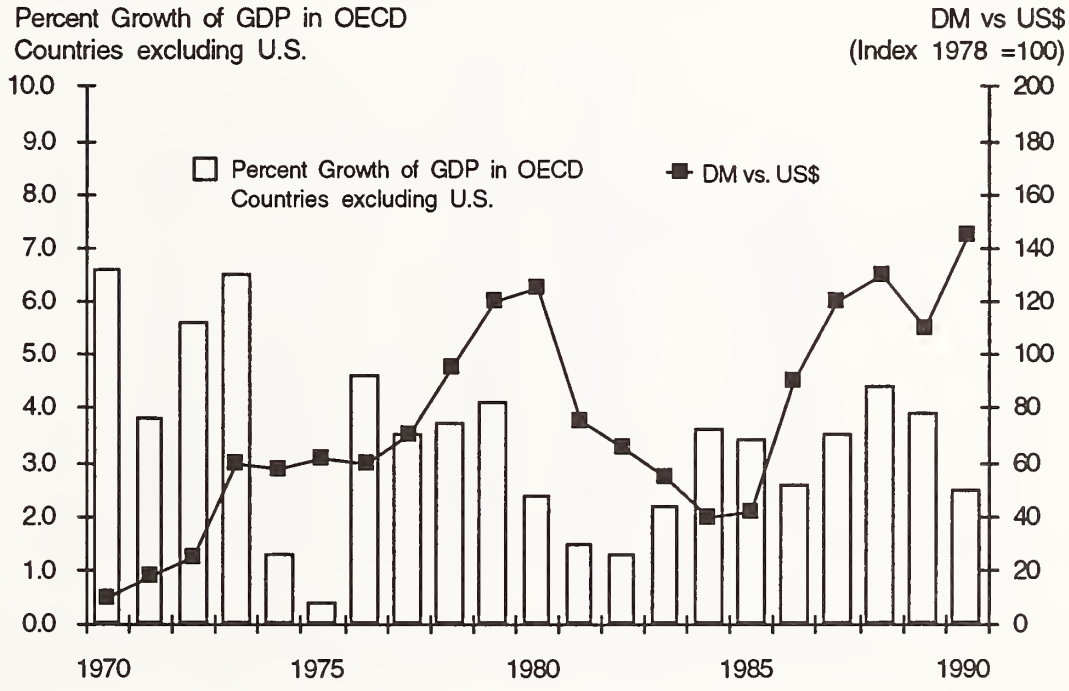


Question. Are changes in export share and volume affected by changes in overall economic output and exchange rates?

Yes. When world incomes decline, world grain trade also usually declines. And when the exchange rate of foreign currencies declines versus the dollar (when the dollar strengthens), then foreign buyers have a more difficult time buying U.S. products.

WORLD ECONOMIC GROWTH AND EXCHANGE RATES

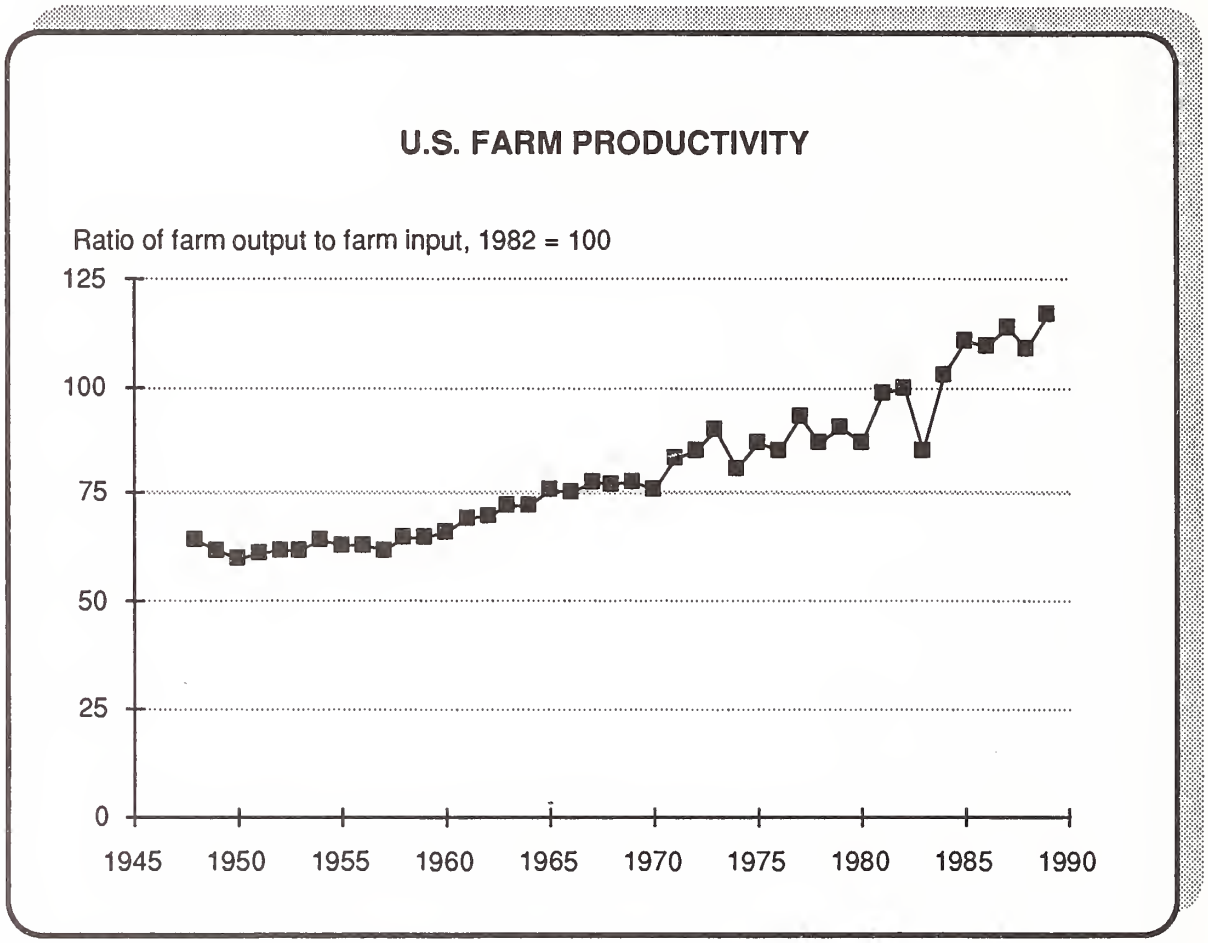
Note: World economic growth is exemplified here by the Gross Domestic Product (GDP) of the 21 major industrial countries (OECD). Exchange rate is exemplified by the German Deutsch Mark (DM) vs. the U.S. dollar.



In the early 1980's, when the world economy slowed and foreign currencies fell versus the dollar, grain exports (and the U.S. share of grain exports) fell dramatically.

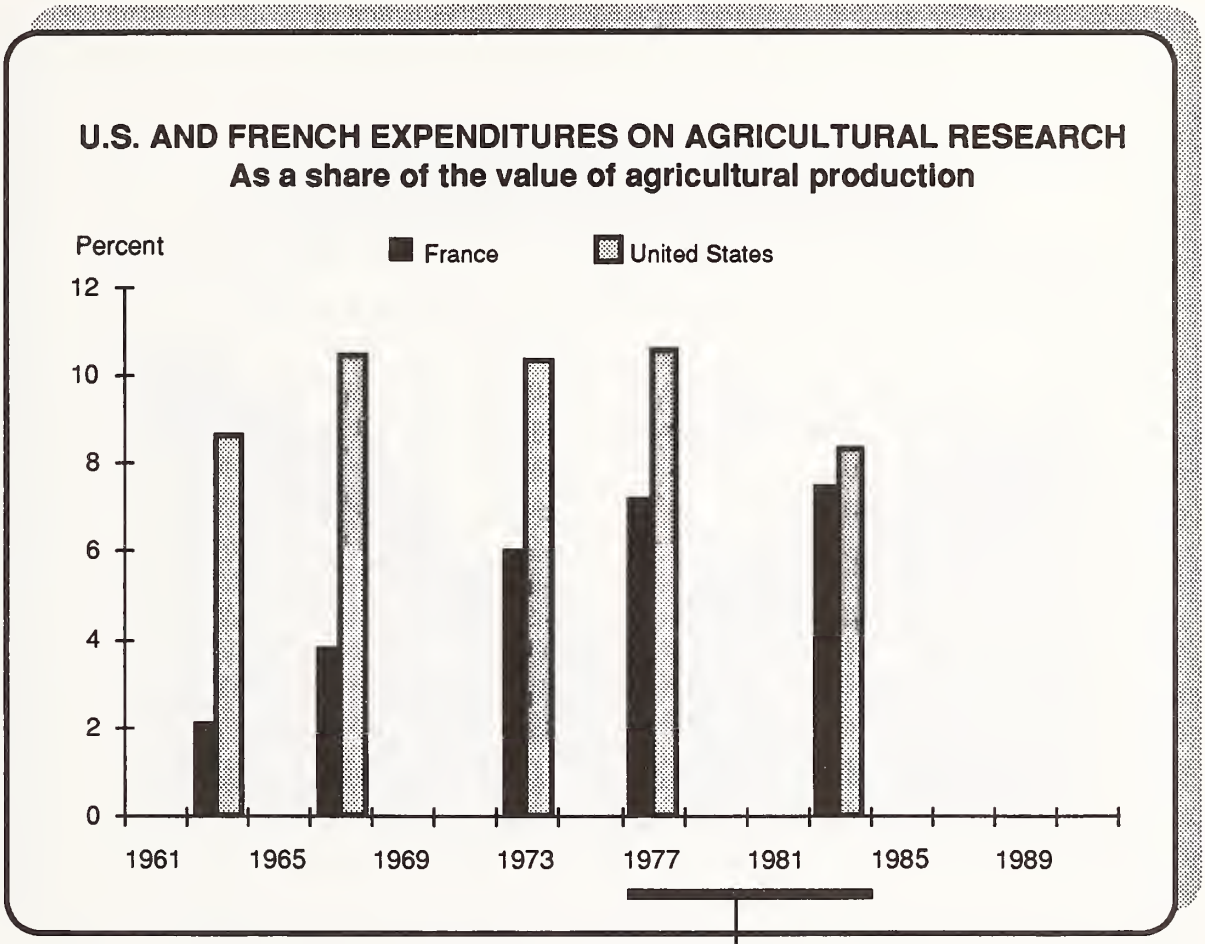
Question. Can loss of world market share take place even when a country's agriculture is becoming more productive?

Yes. As shown below, the relative efficiency of U.S. agriculture has increased steadily since WWII, at a rate greater than most other sectors of the economy.



Question. Has the productivity of foreign agriculture grown more rapidly than that of the United States?

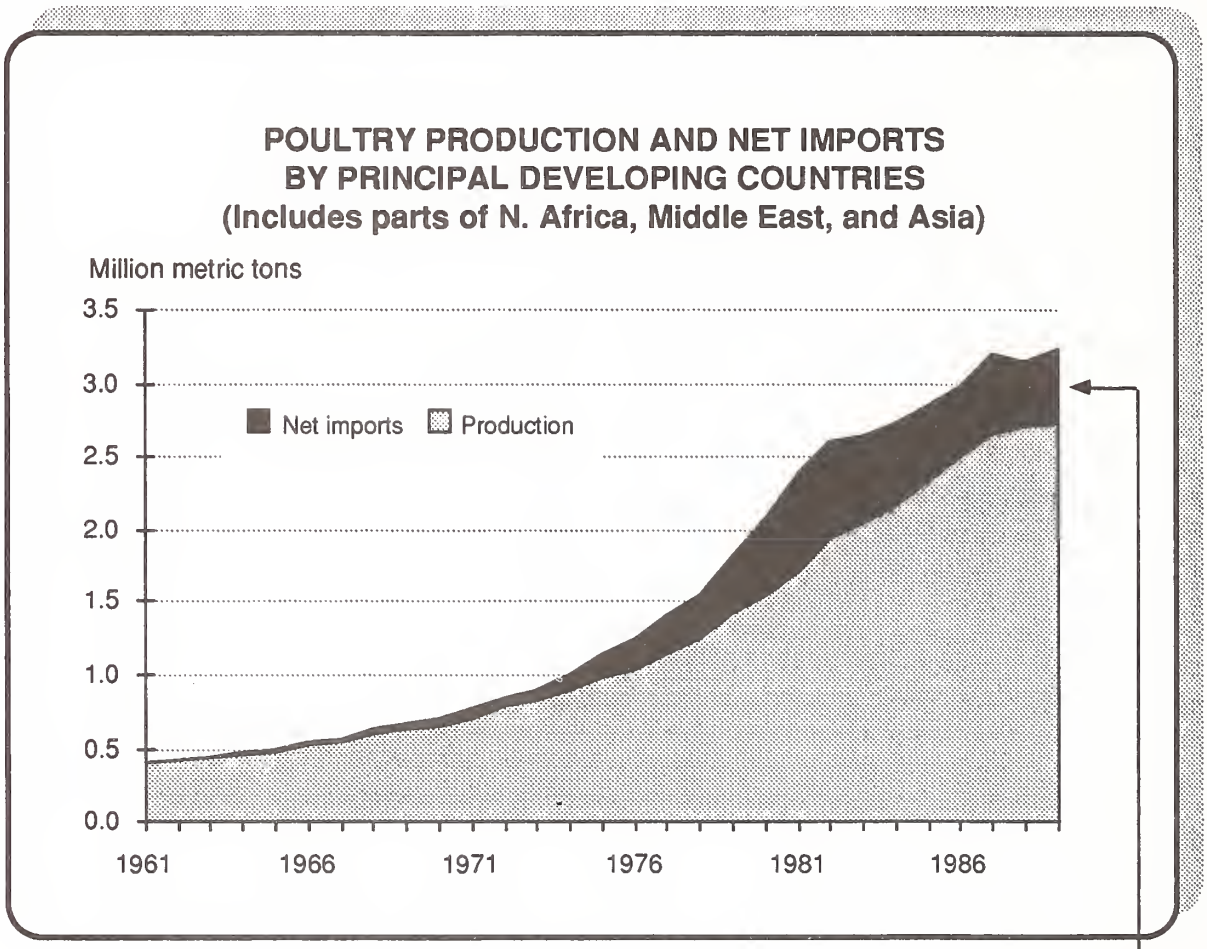
In most cases, no. But in some cases, yes — especially in many countries of the EC. Notice below the increased level of French public expenditure on research to improve agriculture.



New technology comes from research, both publicly and privately financed. U.S. public support for agricultural research has increased, but not as rapidly as in some competitor countries, such as France.

Question. How else can technology affect competitiveness besides directly improving domestic productivity?

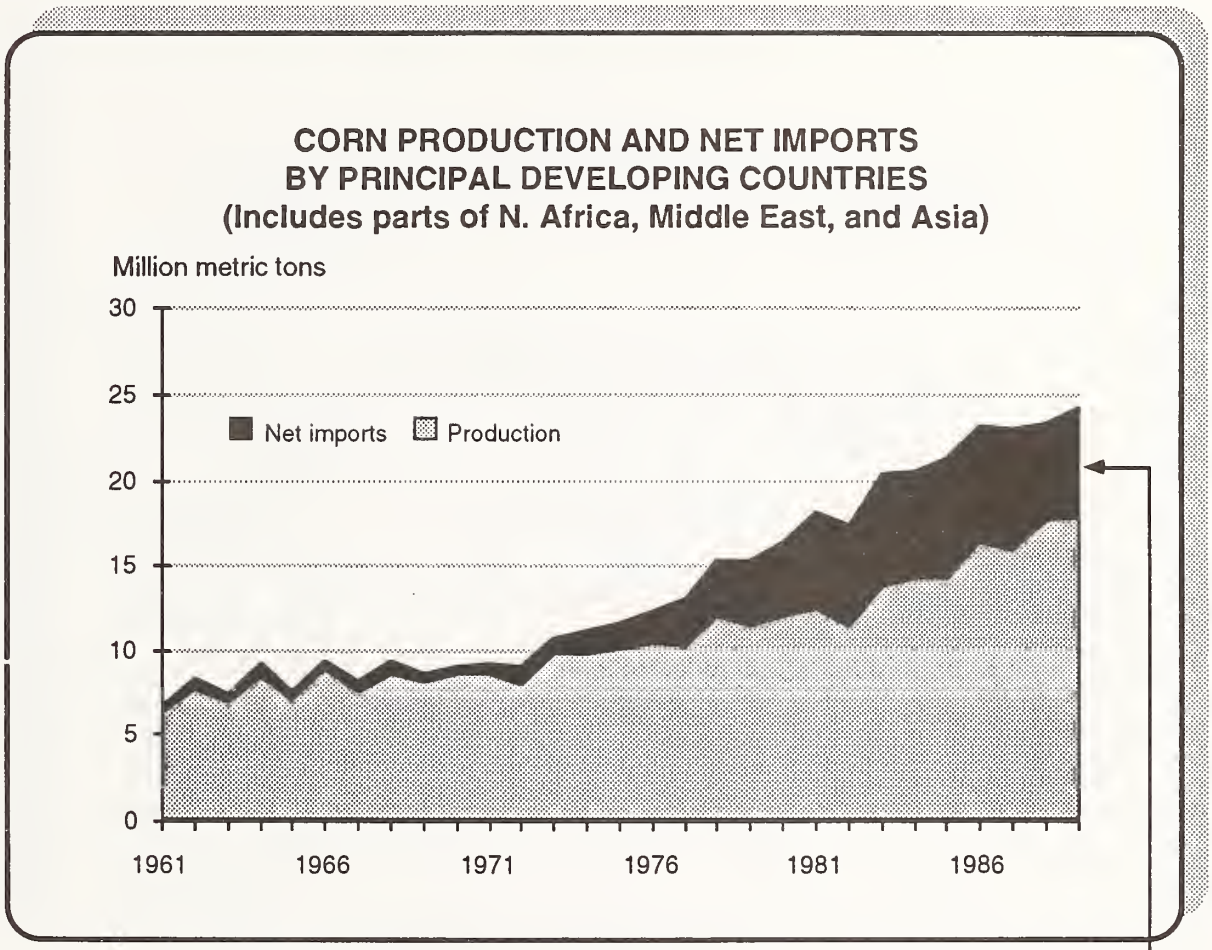
Competitiveness is often affected by the transfer of technology from developed countries to less developed countries. For example, as incomes in LDC's increase, confinement poultry production often transfers to where the poultry products are consumed.



In the 1980's, poultry imports captured a decreasing share of consumption, because of (1) consumers' preference for fresh product (vs. frozen), and (2) government efforts to retain value-added processing.

Question. Does technology transfer affect competitiveness in crop production as well as processed animal products?

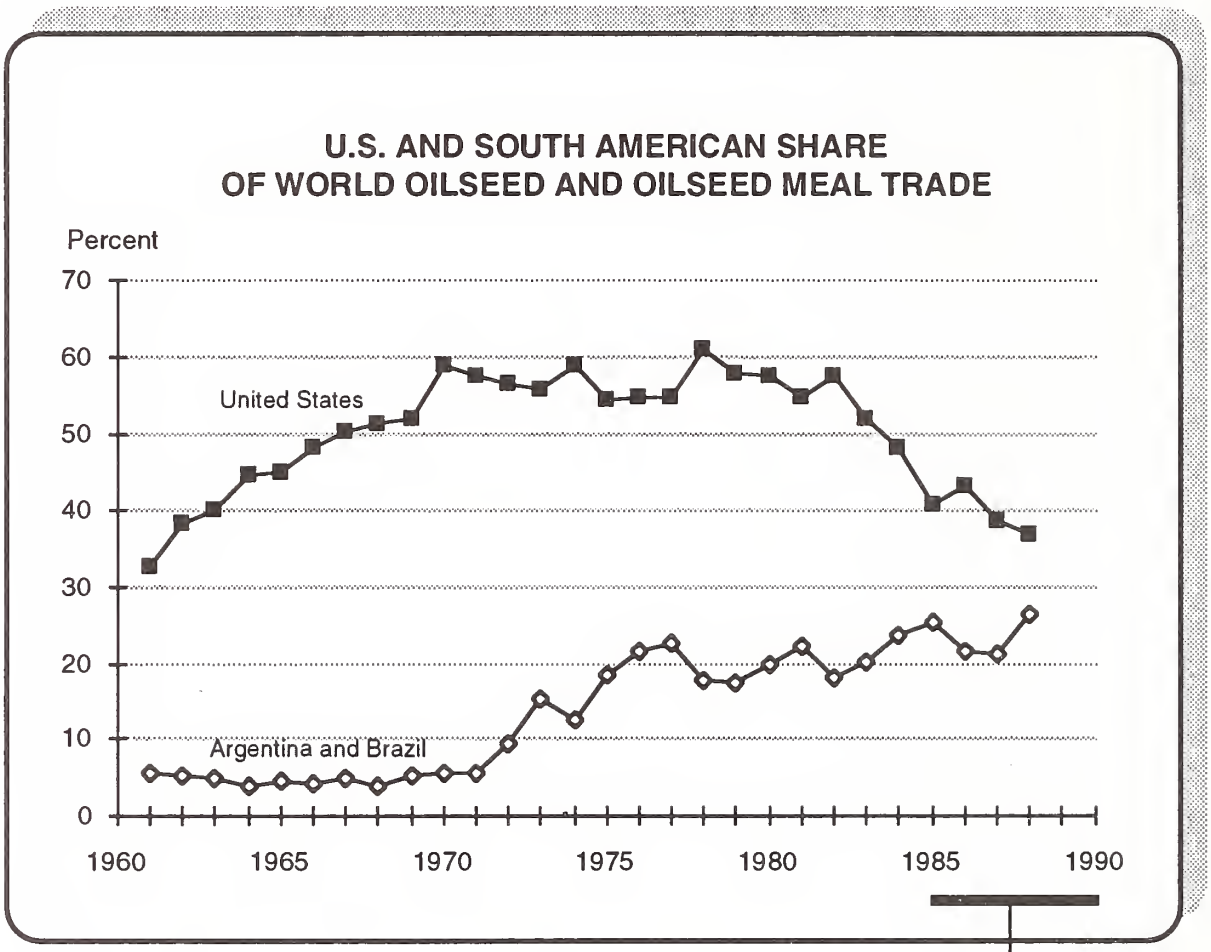
Yes, but with important differences among the various crops. Corn production, for example, requires good soil and moisture, and thus the technology of corn production is difficult to transfer to drylands and tropical areas.



Corn imports capture a somewhat larger share of consumption than does finished poultry, because the relative efficiencies of corn production (soil, climate, infrastructure, etc.) are much harder to "transfer" to the above countries than is the straightforward technology of confined poultry production.

Question. What about oilseeds? What accounts for the loss of U.S. share of world soybean trade?

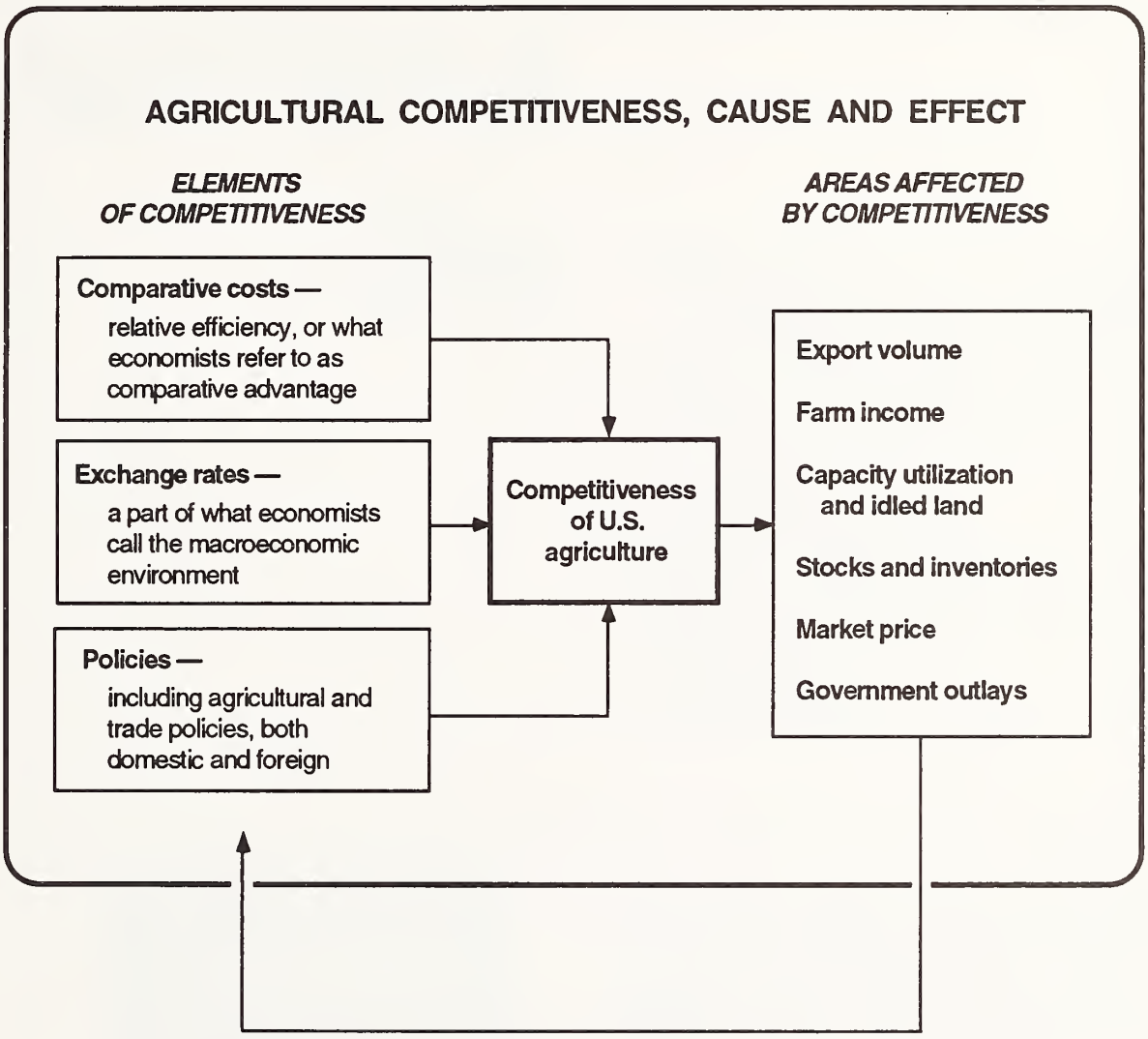
The transfer of soybean production technology in the 1960's to countries of South America which had suitable soils and climate, together with the aggressive export promotion policies of South American governments, explains much of the drop in U.S. soybean competitiveness.



Other countries are also gaining in share of world oilseed trade, including the EC-12 with rapeseed.

Question. (Summary) What are the three main elements of agricultural competitiveness and how have they interacted through history to affect the competitiveness of U.S. agriculture?

The three basic elements of agricultural competitivenss are comparative costs and efficiencies, exchange rates, and government policies. Competitiveness affects export volume and share, market prices, and farm income — which in turn are used as indicators for policy changes that can loop back and alter competitiveness.



"Feedback Loop" in which countries change their relative efficiency and macroeconomic and agricultural policies in order to achieve a desired outcome over time.

The goal of this booklet has been to inroduce the three main elements of competitiveness, their interaction with each other, and the "feedback loop" by which they are constantly being changed.

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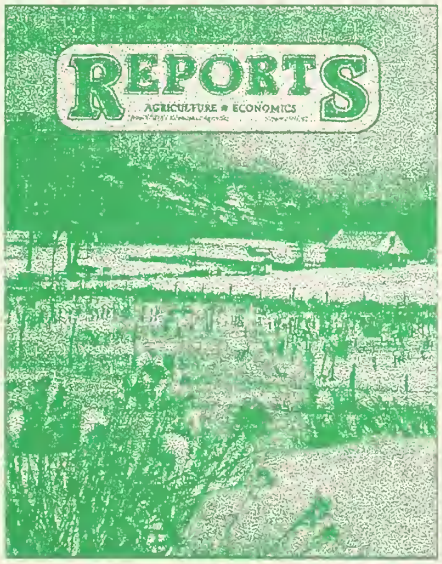

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